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ABSTRACT

The 88 activity guides in this document are intended to supplement the initial or organized instruction of the agricultural teacher at the secondary educational level. Some of the activities require one student to complete, others may need two or more students working in a team. Some activities also require followup checking within a few days to months. Thus long-range planning and activity schedules are experienced by the students, and are typical of out-of-school work experiences. The activity guides cover the areas of grounds maintenance (41 activities), greenhouse (21 activities), landscaping (16 activities), and horticulture mechanics (10 activities), and are numbered consecutively for convenience in making assignments to the students. Each guide includes the title of the activity (e.g., pruning established evergreens, sodding a lawn area, and composting), tools and equipment needed, materials and supplies needed, procedures, special information, and a referral number for cross-reference between or among other guides related to the activity to which the student is assigned. (HD)

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State of New Jersey
Department of Education
Division of Vocational Education

HORTICULTURAL PRACTICES
ACTIVITY GUIDES

Kent Bania, Instructor
Passaic County Vocational and Technical High School
Wayne, New Jersey

John Cummings, Director
Vocational Educational Personnel Development
Division of Vocational Education
New Jersey State Department of Education

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FOREWORD

The Agriculture teacher often finds it necessary to repeat instructions to students in the areas of General and Ornamental Horticulture.

A primary reason for repetition is the seasonal nature of many of the jobs and activities associated with Landscape, Greenhouse, Nursery and related areas in Horticulture. In addition, the jobs and activities are usually those that occur regularly on an annual basis which is typical of the industry.

It is suggested that once initial instruction is given to a class, the teacher may then assign one or more students, who have received instruction, to an activity utilizing the appropriate instructional guide for direction or procedures as well as for a lesson refresher.

The teacher, of course, maintains a supervisory check with each student. A number of students can be assigned to a variety of Horticultural activities typical of an active business venture, thus permitting the teacher a wider scope and efficiency in his daily instruction. As an added feature, students tend to reinforce their learning and experiences when given the opportunity to work on teams utilizing instruction guides.

The Activity Guides in this publication are examples of many that may be prepared by the teacher. Each teacher can add as many additional instructional guides as needed for use in the agriculture department of the school.

These activity guides were prepared by Kent Bania and edited by John M. Cummings.

SUGGESTIONS FOR USE OF ACTIVITY GUIDES

It is important to note that the Activity Guides are not intended to replace the initial or organized instruction given by the teacher of agriculture.

When used, it is suggested that they serve as an extension of the teacher. This permits the teacher to give assignments to those students who have received earlier instruction in the activity, but may need the guides to refresh their memories on procedures.

It is understood that the teacher is supervising the activity as indicated by the (*) asterisk which precedes certain procedural steps in each instruction guide. The teacher may wish to modify the guides to have students check with them at different procedural steps. This flexibility is the choice of the teacher.

Some of the activities require one student to complete. Others may need two or more students working in a team. It is here that a suggestion is offered to use the F.F.A. leadership technique to match up upper grade students with Freshman or Sophomore students.

Some activities also require follow-up checking within a few days to months. Thus long-range planning and activity schedules are experienced by the students, and are typical of out-of-school work experiences.

The activity guides in each of the areas of Grounds Maintenance, Greenhouse, Landscaping and Horticulture Mechanics are numbered consecutively for convenience in making assignments to the students. It also provides a referral number for cross-reference between or among some of the instruction guides. This permits a student to check a procedure that precedes the activity to which he is assigned, in another activity guide. In some cases, the student is advised to check another guide for additional reference in doing the assigned activity.

To add to the activity guides, the teacher may continue the numbering system at the end of each area. In a sense, there need be no end to the number, variety, or type of activity guides added to this publication, as the teacher finds a need.

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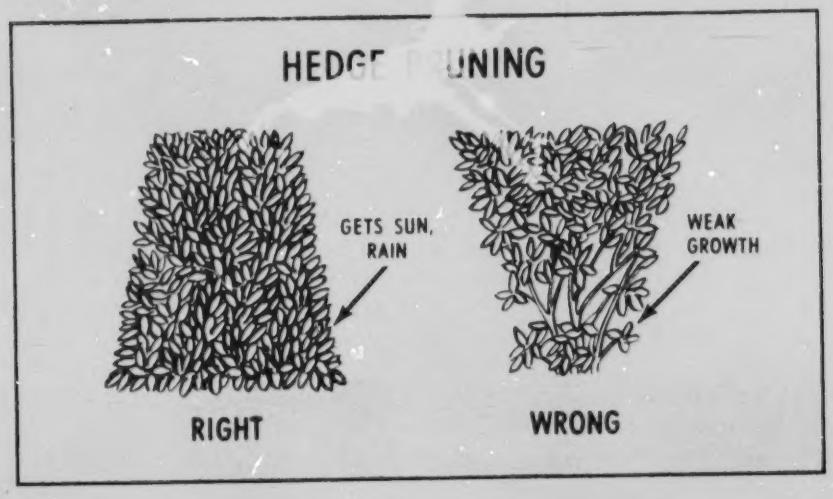
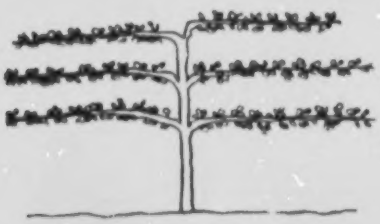
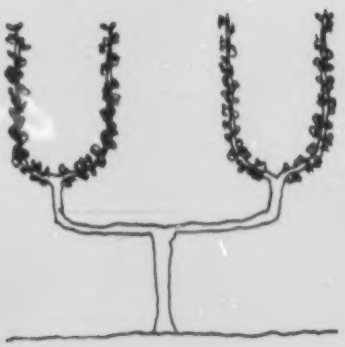


I. GROUNDS MAINTENANCE AREA





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GROUNDS MAINTENANCE

Activity Guide No. 1 — Tree Fertilization

TOOLS/EQUIPMENT:

Soil auger

MATERIALS/SUPPLIES:

Fertilizer (10-6-4), Peat moss

PROCEDURES:

1. Select the tree that needs to be fertilized.
2. Determine the outer limits where you will apply the fertilizer to the tree.
3. Make holes about two feet apart and 18 inches deep using a soil auger. Be sure that the holes are angled. About 15 holes should be made for each inch of diameter of the tree.
* 4. Fill each hole with the correct amount of (10-6-4) fertilizer desired.
5. Fill the rest of each hole with loosely packed peat moss.
6. Close hole with the heel of your shoe when job is completed.

SPECIAL INFORMATION:

Distribute fertilizer holes evenly around base of tree either in concentric circles or with random borings.

REFERENCE:

Picone, Tree Maintenance

Activity Guide No. 2 — Fertilizing Lawn with Spreader

TOOLS/EQUIPMENT:

Lawn Spreader

MATERIALS/SUPPLIES:

Lawn fertilizer: 10-6-4 analysis.
Paper and pencil to calculate quantities of fertilizer to use.

PROCEDURES:

1. Carefully inspect the fertilizer spreader for operational fitness before using. Check for loose fittings, nuts or bolts. Check the adjustments for amounts to be spread and the on and off controls.

2. If fertilizer, lime, or other material was left in the spreader by a previous student, clean it thoroughly before use. If water is used, dry it completely before filling with fertilizer.

* 3. Pace off the lawn area to be fertilized. Determine rate of fertilizer to be distributed. You may want to check with your instructor. Then set the adjustment on the lawn spreader to distribute the rate of fertilizer flow.

4. Direct the fertilizer in straight rows on the lawn, and avoid any overlap of distributed fertilizer.

5. Refill the spreader when it is nearly empty. Shut off spreader when it is being filled to avoid excess pile of fertilizer on the lawn.

6. When job is completed, remove any fertilizer left in the spreader, and clean the spreader thoroughly. Oil any moving parts lightly before putting spreader away.

SPECIAL INFORMATION:

Avoid spreader use on lawns with high lush growth. It is better to mow the lawn first.

TO AVOID STREAKING, mix the fertilizer thoroughly before adding to the spreader hopper.

REFERENCES:

Lawn Care Bulletin, Scott
Your Lawn and Its Care
Bulletin #362-A, N.J. Agri. Ext. Ser.

A key to the amount of fertilizer most commonly preferred in a single application for lawn turf

If the first figure of the analysis is:	Pounds per 1,000 square feet of area
3	33
4	25
5	20
6	17
7	14
8	12
9	11
10	10
12	8
20	5

GROUNDS MAINTENANCE

Activity Guide No. 3 — Liming Soil

TOOLS/EQUIPMENT:

Lime spreader
pH test kit

MATERIALS/SUPPLIES:

Pulverized agricultural limestone.
Paper and Pencil to calculate quantities needed.

PROCEDURES:

1. Take a pH test of a composite soil sample, or several spot soil samples.
2. Determine the rate of lime required for 100 sq. ft. or 1,000 sq. ft. from the pH test results.
3. Pace or determine the total square footage of soil to be limed.
* 4. Calculate the quantity of lime needed to complete the liming job.
5. Inspect lime spreader to be certain it is in operational condition.
6. Distribute the lime with the spreader. Adjust the spreader to the required rate of flow per 100 or 1000 sq. ft.
7. When spreader is nearly empty, refill after the spreader flow is shut off.
8. Distribute in straight even rows; a slight overlap will not be harmful.
9. Clean and lightly oil all moving parts before storing spreader after using it.

SPECIAL INFORMATION:

Avoid liming on a very windy day. Safety glasses should be used to avoid lime getting into your eyes.

When liming soil around acid-tolerant plants, do not spread lime within 24" to 30" of the plants.

REFERENCE:

Liming Soils, Bulletin #365,
N.J. Agric. Ext. Ser.

Soil *pH*	Pounds required per 1,000 square feet to raise soil *pH* to 6.5		
	Sandy loam (light)	Loam (medium)	Silt loam (heavy)
4.0	140	180	250
4.5	115	150	200
5.0	80	115	160
5.5	60	70	90
6.0	25	35	50

Lime Requirements for Different Soils

Ground limestone required to correct acidity in soils of different texture

GROUNDS MAINTENANCE

Activity Guide No. 4 — Seeding a New Lawn

TOOLS/EQUIPMENT:

Mechanical spreader, water ballast roller, and spring rake.

MATERIALS/SUPPLIES:

Grass seed and mulch (straw, hay).

PROCEDURES:

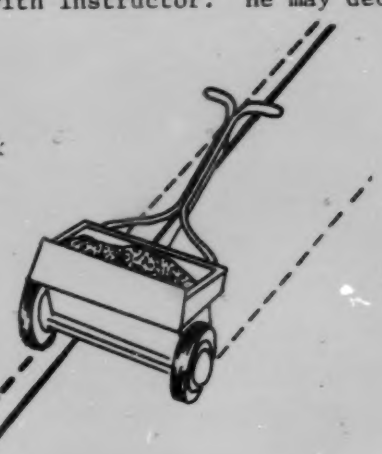
1. Decide on area to be seeded.
2. Decide on proper time of year for seeding.
3. Review suitable lawn mixtures and proper rates of application.
4. Lightly rake the proposed area to kill any newly germinated weeds and to make the final grade.
5. Divide grass seed into two even lots.
* 6. Sow ½ the seed evenly in one direction by hand or with a mechanical spreader; then sow the other half at right angles to the first.
7. Rake the bed surface lightly mixing the seed with the top ½ inch of topsoil.
8. Roll the soil lightly with a water ballast roller to firm the soil.
9. Mulch area with weed-free straw or hay.
10. Water lightly, and keep area moist until grass seed germinates. Then follow regular watering program.

SPECIAL INFORMATION:

If weeds are serious problem, check with instructor. He may decide to use weed killer chemicals.

REFERENCE:

Conover, Grounds Maintenance Handbook



GROUNDS MAINTENANCE

Activity Guide No. 5 Spot Seeding an Established Lawn

TOOLS/EQUIPMENT:

Steel bow rake

MATERIALS/SUPPLIES:

Grass seed and water

PROCEDURES:

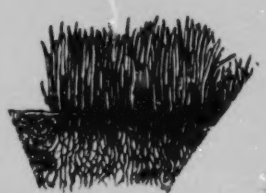
1. Select area where renovation needs to be done. See special information.
* 2. Remove all old grass and weeds that are in the selected area.
3. Rake about one tc two inches deep to loosen soil.
4. Sow grass seed evenly over area by hand.
5. Rake lightly over area mixing seed into upper ½ inch of top soil.
* 6. Press lightly with the smooth sole of your shoe to firm soil down in the area.
7. Sprinkle thoroughly and keep moist until the grass seed germinates.
8. Continue with regular watering program.

SPECIAL INFORMATION:

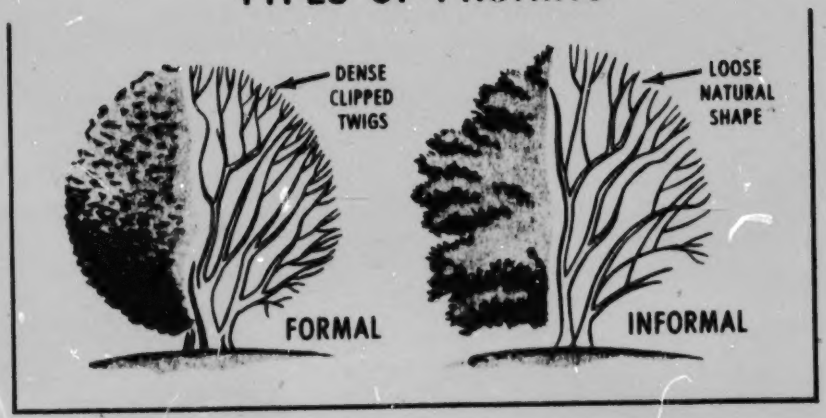
Areas larger than 4-5 square feet should be seeded following Activity Guide No. 4 on the previous page.

REFERENCE:

Concver, Grounds Maintenance Handbook



TYPES OF PRUNING



Activity Guide No. 6 — Pruning New Trees and Shrubs

TOOLS/EQUIPMENT:

Pruning saw, loppers, hand pruning shears

MATERIALS/SUPPLIES:

Tree paint, clothes pins or colored strips of cloth or plastic

PROCEDURES:

1. Stand back at least 12' to 15' from the new tree or shrub to determine the pruning cuts that should be made and the desired finished shape of the plant.

* 2. Using clothes pins or colored strips of plastic or ribbon, identify before cutting the major branches that will be removed.

3. For cuts under 1½" thick, use a hand pruning shears; for over 1½" and up to 1-3/4" use pruning loppers. Branches over 1-3/4" must be removed with a pruning saw if the diameter is not over 6-6½". (Usually new trees and shrubs are rarely heavier.)

* 4. First thin out small heavy growth cutting just above a bud.

5. Second, remove "competing" branches, leaving the branch that grows to the outside of the plant.

* 6. Third, shape the tree or shrub by removing the branches selected indicated in step No. 2 above.

7. After all cuts are made, coat the open cuts with tree paint.

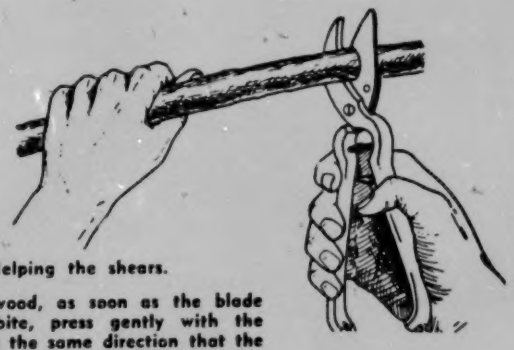
8. Clean up debris. Then clean tools, oil if necessary and store them.

SPECIAL INFORMATION:

Remember, the shape of a young tree will be the shape and conformation of the tree when it is older. Proper pruning to avoid storm damage depends on what is done with the shaping of a tree or shrub when it is young.

REFERENCES:

Pruning Ornamental Trees and Shrubs,
Bulletin #165, U.S.D.A.
Pruning Ornamental Shrubs,
Bulletin #771, N.J. Agri. Ext. Ser.



Helping the shears.

On heavy wood, as soon as the blade begins to bite, press gently with the left hand in the same direction that the blade is moving. Too much pressure may result in splitting.

GROUNDS MAINTENANCE

Activity Guide No. 7 Pruning Established Trees or Shrubs

TOOLS/EQUIPMENT:

Pruning saw, loppers, hand shears

MATERIALS/SUPPLIES:

Tree paint

PROCEDURES:

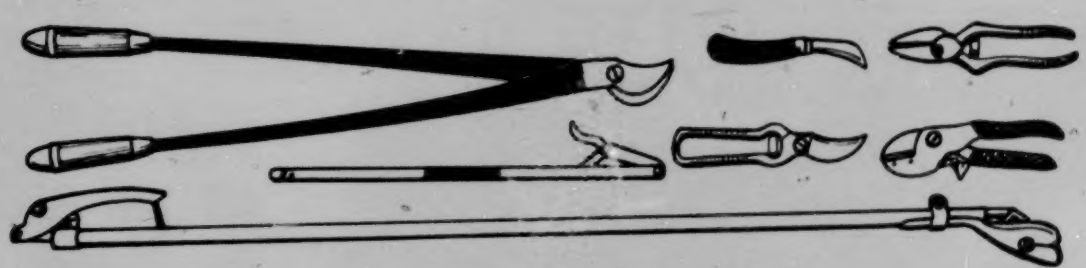
1. Remove all damaged, diseased, or insect infested wood from tree.
* 2. Remove competing branches and dense growth from the tree or shrub.
3. Prune the lower branches that may be a hazard to passers-by, or to vehicle traffic.
4. Shape the tree following the normal growth habit for an oval, round head, columnar, or spreading shape.
5. Coat all pruning cuts on the tree with tree paint.
6. Clean up the debris of pruning.
7. Clean the pruning equipment, oil necessary parts, and store equipment.

SPECIAL INFORMATION:

If tree or shrub has considerable diseased or insect infested wood, check with the instructor for proper disposal of the debris. It may also be necessary to remove the entire tree, or to provide more intensive disease or insect treatment.

REFERENCES:

Pruning Ornamental Trees and Shrubs, Bulletin #165, U.S.D.A.
Pruning Ornamental Shrubs, Bulletin #771, N.J. Agri. Ext. Ser.



Desirable edge pruning tools.

SHAPING CONIFERS

Prune pines in late spring by removing one-half of the candle, or new shoot. Do not damage needle tips because the tips of cut needles tend to turn brown.

You can reduce open spaces on spruces by cutting off one-half of the leader, or terminal shoot, in the spring when the new needles are about half developed.

Keep side branches from growing out of bounds by removing the terminal bud. This not only slows outward growth but also helps to make the plants more bushy.

You can replace a lost leader by tying one of the branches in the top whorl to a vertical brace.

Trees that have already grown too wide can be narrowed by cutting the branches back to an inner bud.

If the tree develops two leaders, remove the less desirable one in early spring. Trees with more than one leader are weaker and less attractive than trees that have a single, strong, central leader.

GROUNDS MAINTENANCE

Activity Guide No. 8 — Pruning Established Evergreens

TOOLS/EQUIPMENT:

Hedge shears, pruning loppers, pruning hand shears, and hand pruning saw.

MATERIALS/SUPPLIES:

Tree paint

PROCEDURES:

1. Head back the terminal growth of coniferous evergreens.
2. Thin out dense center growth when needed.
* 3. With the hedge shears, prune those evergreens that are shaped into formal or geometric designs. Regular screens or hedges may also be trimmed with hedge shears.
* 4. Trim only part of the new growth of spruce trees, and do not head back top terminal growth (or leader).
5. Inspect for insect or disease damage. If evident, report it to the instructor.
6. Clean up pruning debris and tools. Oil tools if necessary.
7. If cuts larger than one-inch were made, coat the cut with tree paint.

SPECIAL INFORMATION:

Most evergreens have a resinous sap that can "gum" up the tools. It will require a solvent to clean the tools. Check with the instructor.

REFERENCES:

Pruning Ornamental Trees and Shrubs, Bulletin #165, U.S.D.A.
Pruning Ornamental Shrubs, Bulletin #771, N.J. Agri. Ext. Ser.

Activity Guide No. 9 Repair: Bark Damage on Trees

TOOLS/EQUIPMENT:

Sharp clean knife, 1", 1½", and 1-3/4" wood chisels; wood or plastic mallet, and soft wire brush.

MATERIALS/SUPPLIES:

Tree paint or special compound

PROCEDURES:

1. Remove all loose and shreadded or damaged bark from the trunk or from large branches.

* 2. With a clean knife or a sharp chisel, cut the edge of the damaged bark back to undamaged bark. (Cut beyond damage into good bark at least ½", or to the firm bark wood.)

3. Wire brush the surface where the bark has been removed.

4. Paint the exposed tree wood (without bark) with tree paint or a special compound.

5. Clean up debris; then clean and store tools.

SPECIAL INFORMATION:

To avoid pockets for water or snow to collect, chamfer outward to the new, or established healthy bark and away from the exposed wood. These pockets are to be avoided because they encourage rot instead of fast new bark growth.

REFERENCE:

Kains and McQueston, Propagation of Plants

GROUNDS MAINTENANCE

Activity Guide No. 10 — Repair: Split Limbs on Trees

TOOLS/EQUIPMENT:

Auger bits ½" and 1", auger brace, sharp knife/chisel, mallet, eye bolts with nuts and washers for ½" or 3/4" holes, combination wrench set, and coil of 1" tree climber's rope.

MATERIALS/SUPPLIES:

½" galvanized or rust proof chain with eye bolt connector links, tree paint and special compound, and wood glue.

PROCEDURES:

1. Use tree climbers rope to secure damaged or slit limb to upper undamaged limb.

2. Clean away all damaged bark at least ½" back from the damaged or split area of limb.

* 3. Bore holes through the center of the damaged area of the limb at a right angle to the limb surface using a ½" auger bit if the limb is not larger than 6" in diameter. Spread glue on inner surfaces of split.

4. Insert eye bolts through holes, and place washer and nut on opposite end of eye. Eye should be on top of the limb. Tighten the nuts evenly to close the gap caused by the split damage.

* 5. Use chain only if the limb is too heavy to support itself until new bark heals the split.

* 6. If chain is needed, connect the chain from eye of bolt to eye bolt placed into upper limb (or trunk) nearest the damaged limb. Allow slack in chain for wind movement of branches.

7. Clean up debris; then clean and store tools.

SPECIAL INFORMATION:

Usually this job is handled by two people. One to serve as safety man and to hand tools to the tree repairer or to hold ladder.

REFERENCES:

Repair of Storm Damaged Trees, Bulletin, U.S.D.A.

Activity Guide No. 11 / Winter Protection of Trees and Shrubs

TOOLS/EQUIPMENT:

Hammer or small sledge, and staple gun.

MATERIALS/SUPPLIES:

Tree guy wire roll, 2" x 2" x 8' tree stakes, 1½" x 2" x 6' stakes, burlap (or heavy plastic) 48" wide rolls, 3/8" staples, tree wrap, and 3" - 4" hose rings for tree braces.

PROCEDURES:

1. Using commercial grade tree wrap, begin at the base of newly transplanted tree, and firmly wrap the tree trunk. Overlap at least 1" as the tree wrap is applied.

* 2. Wrap tree trunk up to the first set of lower branches. Secure end with staple, or tuck it back under on last turn of wrap around trunk.

3. Drive tree stake 16" to 18" into ground approximately 6" to 8" away from tree trunk at ground level with a 45 degree angle away from the tree.

* 4. Attach hose ring to tree trunk using guy wire. Attach the ring to stake at a point about 8" down from the top.

5. To protect new plantings of ornamental shrubs, drive 6' stakes, 30" apart into the ground around the shrubs near the terminal edge of the shrub branches.

* 6. Attach 48" burlap (or plastic sheeting) to the stakes with staples. Allow a slight amount of flexible movement to permit resistance to wind. Burlap or plastic should be about two inches from soil at base of stake.

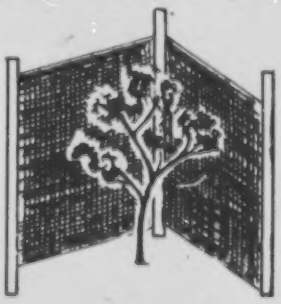
7. For large runs of protective burlap, place a diagonal support inside the enclosed area and against every 4th stake with one end of the support in the ground and the other nailed to top of stake.

SPECIAL INFORMATION:

Tree wrap is put on at the time of new planting. Shrub protection should be put up about the time of the first heavy frost in the fall.

REFERENCES:

See Instructor



Activity Guide No. 12 — Guy Wires on Trees

TOOLS/EQUIPMENT:

Carpenter hatchet, hammer or small sledge, and electrician's pliers.

MATERIALS/SUPPLIES:

Wood stakes (1½' x 2" x 30") three for each tree; spool guy wire, and rubber hose -- 3/4" diameter.

PROCEDURES:

1. After tree is planted, mark a circle line around the tree about 2/3rd out from the trunk toward the terminal ends of the branches.

* 2. Position three wood stakes into the ground on the circle line with each stake 1/3 the diameter of the circle from the next stake.

3. Drive each stake into the ground at a 45 degree angle with the top of the stake away from the tree.

4. Place rubber hose around the trunk of the tree just above the first set of branches nearest the ground. Insert the guy wire through the hose and wrap at least 4 inches back around the long end of the wire. Attach the long end to the stake*, and wrap at least 4 inches back and around the wire leading down from the tree. NOTE: *to avoid an injury, wear gloves and use pliers to twist wire.*

5. Repeat step No. 4 for the other two stakes.

* 6. Check guy wires. They should be firm but with a slight slack to allow for some tree flexibility on windy days.

SPECIAL INFORMATION:

* To secure wire around stake, cut small ½" notch into stake about 8" down from the top to permit guy wire to be positioned without slippage.

REFERENCES:

See Instructor

Activity Guide No. 13 — Planting Balled and Burlap Stock

TOOLS/EQUIPMENT:

Round-tipped shovel and tamping tool

MATERIALS/SUPPLIES:

Top soil and water

PROCEDURES:

1. Select the balled and burlap plant that is to be planted.
2. Select the location that the plant will be placed. Keep in mind soil conditions, drainage, sunshine, and moisture.
3. Using a round-tipped shovel, dig a hole about 4 inches wider and deeper than the ball on the plant.
4. Place about 4 inches of top soil at the bottom of the hole.
5. Set the balled and burlap plant in the hole.
* 6. Turn the plant so that the best side of the plant is facing where it will be seen the most.
7. Place 3 or 4 inches of top soil around ball of plant.
8. Tamp soil around the ball with a tamping tool. Add another 3 or 4 inches around ball and tamp down again. Continue this process until the hole is half full.
* 9. Loosen burlap around ball and roll back to the soil that has been tamped down.
10. Fill hole with water, and let it disappear into soil. Repeat this process.
11. Fill hole with topsoil leaving at least a 2-inch depression around the plant to catch water.

SPECIAL INFORMATION:

Check with instructor on the use of a planting board for large (6'-8') shrubs.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.

Plant properly.

Activity Guide No. 14 — Using Plant Sprayer

TOOLS/EQUIPMENT:

Pressure plant sprayer

MATERIALS/SUPPLIES:

Spray material

PROCEDURES:

1. Determine from instructor the plant to be sprayed and for what purpose, i.e., insects, diseases, etc.
2. Check sprayer to be certain that it is in operating condition -- holds pressure and spray nozzle operates. It should be tested by using water.
3. Carefully read the instructions on the container for use of spray material. Observe all safety precautions such as ratio of mix, clothing to wear, etc.
* 4. Check with the instructor before pressure is applied.
5. Apply pressure to the sprayer. Look for leaks and correct problem if leaks are found. Wear proper protective gear such as nose and eye protection devices, gloves, coveralls, etc. when they are needed.
6. Carefully spray the tree, shrub, or lawn. To keep spray from drifting, don't spray if it is too windy.
7. Depressurize the sprayer; clean and store it properly. Store spray material in proper place.

SPECIAL INFORMATION:

Most accidents with spray materials happen because directions for proper use were not followed. It is very important to follow all steps and directions for safety as well as getting a job well done.

REFERENCES:

Insects of Evergreens, Trees, and Shrubs.
Ext. Service Bulletin No. 321 New Jersey
Tree, Shrub, and Flower Pest Control,
Bulletin #328, N.J. Agri. Ext. Ser.

Spray thoroughly.

Activity Guide No. 15

Bulb Planting

TOOLS/EQUIPMENT:

Trowel

MATERIALS/SUPPLIES:

Hyacinth bulbs (or other spring flowering bulbs), and peat moss or composted soil.

PROCEDURES:

1. Select the area where the bulbs are to be planted.

* 2. Place the bulbs on the ground where they are to be planted. Arrange them so you get an idea of how the area will look when they bloom in spring.

3. Dig holes with a trowel, so that the bulbs will be four inches below the surface of soil.

4. Place bulbs into the hole with basal end down.

5. Fill holes with soil that was taken out of the holes. If soil is hard or poor, dig larger holes and backfill with composted soil, or with mixed soil and peat moss of a 50/50 ratio.

SPECIAL INFORMATION:

The depth of planting bulbs vary according to the type of bulb. Refer to reference for depth recommendations.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.

Anemone apennina
Windflower

Activity Guide No. 16 — Forcing Bulbs

TOOLS/EQUIPMENT:

Coldframe, greenhouse

MATERIALS/SUPPLIES:

Daffodils, pots, and water.

PROCEDURES:

1. Place daffodil bulbs properly in flower pots in a good potting mixture. (See Greenhouse Guide #21.)
2. Water pots thoroughly.
3. Place flower pots outside in a coldframe. (Do not stack pots on top of each other.)
4. Cover coldframes, and keep bulbs there for at least 15 weeks.
* 5. Check pots regularly for drying out and growth rate. (Water if pots dry out.)
6. Remove pots from coldframe and move them into greenhouse about 4 weeks before schedule time for use or sale.
7. Keep greenhouse temperature at 55° to 60° during the 4 weeks that the bulbs are in the greenhouse.

SPECIAL INFORMATION:

The later the bulbs are removed from the coldframe, the quicker they force.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices.
Nelson, Flower and Plant Production in the Greenhouse.

Activity Guide No. 17 — Transplanting Annuals

TOOLS/EQUIPMENT:

Garden spade, hand trowel, wood stakes, line, and soil soaker

MATERIALS/SUPPLIES:

Annuals to be transplanted, starter solution, water, and composted material

PROCEDURES:

1. Annuals in the flat should have been watered thoroughly at least two hours prior to transplanting.

2. Prepare the annual bed by deep spading or rototilling. Mix in composted material and a light dressing of 5-10-5 commercial fertilizer (1-½ lb. per 100 sq. ft).

* 3. Determine the arrangement desired in the planting -- usually the tall varieties in the rear (or center in island beds) with groups of smaller annuals in front.

4. Color harmony is to be checked. White flowers can be used to break up possible clashes of color.

5. Where straight lines or special lines of annuals are desired, the wood stakes and line should be used to guide the plantings.

* 6. When planting, use a trowel and firm soil around the roots of each transplant. Water the beds with a soil soaker.

7. Clean and store tools. Replace materials in proper area.

SPECIAL INFORMATION:

It may be necessary to replace one or two transplants that did not establish readily. Wait at least three to five days to determine this.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds

Activity Guide No. 18 — Preparing a Lawn Seedbed

TOOLS/EQUIPMENT:

Spade, mechanical spreader, steelbow rake, spring rake, and soil test kit

MATERIALS/SUPPLIES:

Fertilizer (10-6-4) and lime

PROCEDURES:

1. Test soil for acidity and nutrient content.
2. Grade area to the appropriate level of contour that is practical.
* 3. Add lime if needed to keep soil acidity at neutral or slightly above. Use a mechanical spreader to apply the lime.
4. Spade the top 8 to 10 inches of soil, breaking up all large clumps. Large areas should be rototilled.
* 5. Hand rake area to remove any rocks, sticks, or debris from area.
6. Add fertilizer (preferably 10-6-4) to the soil. Broadcast fertilizer either by hand or with a mechanical spreader, and rake lightly into soil.
7. Add soil conditioners if necessary.
8. Make the final grading so that there are no low spots, and rake lightly to form a shallow layer of fine soil for the grass seed.

REFERENCES:

Conover, Grounds Maintenance Handbook
Nelson, Landscaping Your Home

Root Pruning an Evergreen

Same treatment for deciduous shrubs if whole top is to be removed for renovation.
1st Step—Mark circle at spread of branches.
2nd Step—Tie up lower branches with soft rope completely around plant.
3rd Step—Mark circle two-thirds distance from trunk to mark at spread of branches.
4th Step—Sharpen spade.
5th Step—Thrust spade vertically into ground to full depth, cutting off roots.
6th Step—Untie branches.

Activity Guide No. 19 — Root Pruning Trees and Shrubs

TOOLS/EQUIPMENT:

Nursery-type, flat-edged shovel and garden rake

MATERIALS/SUPPLIES:

NONE

PROCEDURES:

1. Rake away any mulch (peat moss, wood chips, etc.) at least 6" from the terminal spread of the tree or shrub.
2. Hold nursery-type shovel vertically at a 90 degree angle to the ground surface.
* 3. Push down vertically into the soil at least 14" to 16" at a point outward from the center of the tree or shrub but not beyond the terminal edge of the outerbranches.
4. Continue to vertically cut in a series of connected cuts along a line circling the tree or shrub.
5. Rake the original mulch back over the area around the base of the tree or shrub.
6. Water tree or shrub if necessary.
7. Clean and store tools.

SPECIAL INFORMATION:

Root Pruning stimulates a more fibrous root growth closer to the tree or shrub, so watering and feeding can be more effective. In addition, root pruning often stimulates many shrubs into improved blooming or flower production.

REFERENCES:

Kains & McQuesten, Plant Propagation

GROUNDS MAINTENANCE

Activity Guide No. 20 — Top Pruning Trees and Shrubs

TOOLS/EQUIPMENT:

Pruning saw, loppers, hand pruning shears, and step ladder

MATERIALS/SUPPLIES:

Tree paint, brush and strips of white or colored plastic or cloth

PROCEDURES:

1. Remove all sucker shoots first; then observe tree from a distance to determine what must be trimmed to top or lower growth.

* 2. Select the branches to be removed by attaching a strip of colored plastic or cloth at the point of pruning. Instructor will check your selection before any cuts are made.

3. Prune out the branches selected in step No. 2. Use proper pruning methods and the correct tool.

4. Paint fresh cuts with tree paint.

5. Stand back from the tree or shrub, and observe the symmetry, balance and typical natural shape of the tree or shrub.

* 6. It may be necessary to make a few light cuts (usually not longer than 8" to 10") to achieve an attractive appearing tree or shrub.

7. Clean and store tools with unused supplies.

8. Broom rake the area around the tree or shrub for neat appearance.

REFERENCES:

Pruning of Ornamental Trees and Shrubs, Bulletin #165, U.S.D.A.
Pruning Ornamental Shrubs, Bulletin #771, N.J. Agri. Ext. Ser.

Prune moderately.

Activity Guide No. 21 — Spraying Trees and Shrubs

TOOLS/EQUIPMENT:

Pressure sprayer, safety gloves, clothing, and step ladder (if needed).

MATERIALS/SUPPLIES:

Insecticide or fungicide, water, and fixer if needed.

PROCEDURES:

1. Refer to Activity Guide No. 14 for review of using a plant sprayer.

* 2. Determine the purpose and need for spraying the ornamental tree or shrub. List the insects and/or diseases affecting the plant; check with the Spray Reference Guide advised by the instructor; and then use the proper material for spraying, i.e., malathion, captan, etc.

3. Carefully read the directions on the chemical to be used. If you are in doubt, check with your instructor.

4. Fill sprayer to the proper level with the prepared spray mix, after you have determined that the climatic conditions and temperature are satisfactory for spraying.

* 5. If wax foliage is used, it may be necessary to use a fixer in the spray to adhere it to the foliage. Ask your instructor for advice.

6. When spraying, it is important to cover the underside of the foliage as well as the upper side. A fine steady mist spray is usually as adequate as a heavy strong stream. When finished, clean and store equipment.

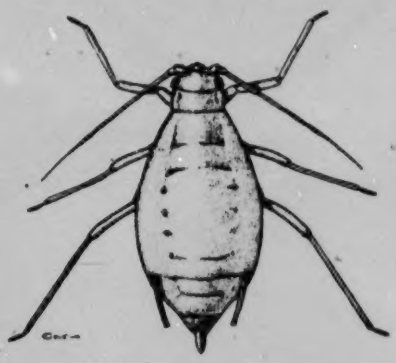
SPECIAL INFORMATION:

Organic chemicals are always dangerous if they are not used properly. Serious irritation and damage can be done to the skin and eyes if proper methods are not followed. It may also be necessary to use a respirator. (Check with your instructor.)

REFERENCES:

Conover, Grounds Maintenance Handbook.
Insects of Evergreen, Trees, and Shrubs, Bulletin #321, N.J. Agri. Ext. Ser.
Tree, Shrub, and Flower Pest Control, Bulletin #328, N.J. Agri. Ext. Ser.

Adult and larva of green lacewing.



Green peach aphid, wingless form.

GROUNDS MAINTENANCE

Activity Guide No. 22 — Edging Flower Beds

TOOLS/EQUIPMENT:

Spade

MATERIALS/SUPPLIES:

Selected type of edging material, i.e., brick, metal strips, lumber strips, etc.

PROCEDURES:

1. Decide on design for the edging around the flower bed.
2. Using the bottom edge of a spade, line out the proposed shape by digging down 2 to 3 inches into the turf area.
* 3. Remove all the turf between the spaded line and the flower bed.
* 4. Decide on the type of rigid edging material to be used, keeping in mind that the material should be as inconspicuous as possible. (Metal strips, brick, or lumber strips can be used.)
5. Place rigid edging material along the edge of the turf area.
6. Secure the edging material so that it will stay in place. The best way is to bury at least 1/3 of the total height of the edging material into the soil.

SPECIAL INFORMATION:

Edging materials greatly reduce the amount of maintenance required to keep flower beds looking good.

REFERENCES:

Nelson, Landscaping Your Home
Hoover, Approved Practices in Beautifying the Home Grounds

Activity Guide No. 23 Ball and Burlapping Trees and Shrubs

TOOLS/EQUIPMENT:

Long or short handled shovel (or spade)

MATERIALS/SUPPLIES:

Roll of 48" burlap, heavy sisal twine, and pocket knife

PROCEDURES:

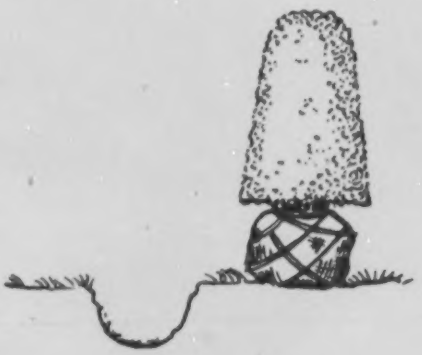
1. With a sharp spade, dig completely around the tree or shrub cutting a trench at least 6" wide and 14" deep.
2. Spread burlap on ground near the tree or shrub to be dug and balled.
* 3. When the trench is completed around the tree or shrub, dig under the ball of soil, and lift the tree or shrub free of the ground.
4. Lift tree or shrub out of hole, and place it carefully on the spread burlap.
5. Prune away ragged roots, and shape the soil into a ball.
6. Pick up opposite diagonal corners of the burlap, and tie the corner ends together around the trunk.
* 7. Tie wrapped ball with sisal twine to keep the soil firmly in place during handling.
8. Water the balled tree or shrub with a fine mist of water until excess water begins to seep out from ball of soil and roots.
9. Clean and store tools; store the burlap and sisal twine.

SPECIAL INFORMATION:

Soil should be moist enough to hold together when a small handful is squeezed.

REFERENCES:

Kains & McQuesten, Propagation of Plants



Activity Guide No. 24 Transplanting Trees and Shrubs

TOOLS/EQUIPMENT:

Nursery spade, or shovel
Water hose, or water can

MATERIALS/SUPPLIES:

Seedlings to be transplanted

PROCEDURES:

* 1. If seedlings are small -- 6" to 8", a trench may be dug instead of individual holes.

2. Keep seedlings shaded and the roots moist. Pack with spaghnum or peat moss to keep roots and lower stems moist.

3. Select vigorous, healthy seedlings. Plant at the same level as they were growing in the flat or coldframe.

4. Prune off the broken roots or damaged top growth of seedling.

* 5. Spread the roots out, and firm the top soil in, around, and over the seedling roots. Fill trench with soil to about half the depth.

6. Water soil around seedlings lightly, and finish the backfill with soil to the surface level. Firm soil with shoe.

7. Clean and store equipment.

SPECIAL INFORMATION:

Do not permit seedlings to dry out until they are established. Soak the soil at least twice a week around the roots of newly planted seedlings.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 25 — Mulching Shrubs

TOOLS/EQUIPMENT:

Pitchfork

MATERIALS/SUPPLIES:

Mulching material (hay, straw)

PROCEDURES:

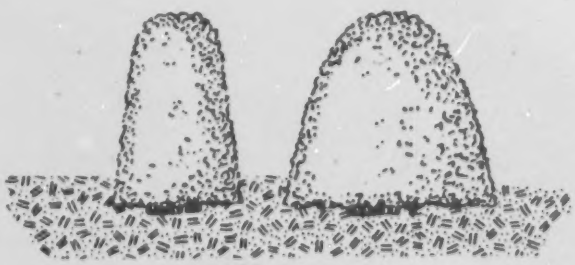
1. Decide on what area will be mulched, and how much mulch will be needed. (Approximately 150 pounds of straw or hay will cover 1000 sq. feet, 2 inches thick.)
2. Pick the type of mulch that you want. Remember, it should be free from weed seeds.
* 3. Clean the area where mulching material will be placed. Remove all weeds.
4. Shake out the straw or hay thoroughly with a pitchfork.
5. Spread the hay or straw evenly over the area to be mulched with a pitchfork.
6. Check to see that at least 2 inches of hay or straw is covering the soil. You should not be able to see the soil.
7. Water mulch lightly to settle it.

SPECIAL INFORMATION:

Materials such as sawdust, pine bark chips, or peat moss could be used depending on the owner's preference for appearance.

REFERENCES:

Ball, Ball Red Book
Conover, Grounds Maintenance Handbook



GROUNDS MAINTENANCE

Activity Guide No. 25 — Proper Watering of Grounds

TOOLS/EQUIPMENT:

3/4" hose, fan type sprinkler, and canvas soil soaker

MATERIALS/SUPPLIES:

Water

PROCEDURES:

1. Use a sprinkler device attached to a hose to water lawns.
* 2. Move sprinkler device so that all lawn areas receive at least 1 inch of water a week.
3. Leave sprinkler devices on for at least 2 to 3 hours at a time, to develop stronger root systems.
4. Water trees and shrubs thoroughly with a hose to encourage good, strong, deep root systems.
5. Form a ridge of soil around the base of newly planted trees and shrubs, so that water will not run off. Use a soil soaker.
* 6. Water flowers thoroughly to encourage strong root systems. Leave a sprinkler on for 2 to 3 hours to provide the proper amount of water drenching for flowers.
7. Use canvas soil soaker in areas that require slow and steady moisture without flooding.

SPECIAL INFORMATION:

To determine the need for watering, dig up a shovelful of earth 3 or 4 inches below the soil surface. Squeeze some soil in your hand. If it can be made into a ball, then no watering is necessary.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 27 — Wrapping Trees

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Kraft crepe paper 6 in wide and twine.

PROCEDURES:

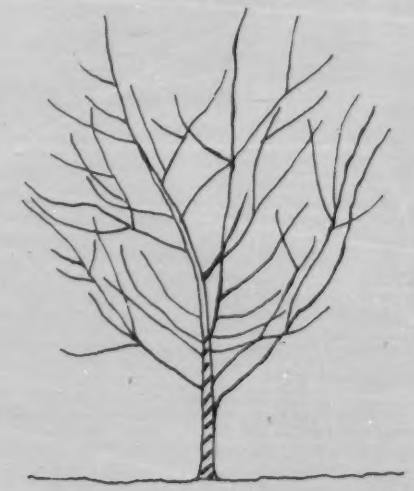
1. Decide which trees need to be wrapped.
2. Remove all suckers from trunk of tree for a smoother bark area.
3. Use 6-inch wide kraft crepe paper. Start wrapping spirally around the lower part of the bottom branches down the trunk to the ground.
* 4. Overlap each wrap of the spiral by going over half the preceding wrap to form a double wrapping.
5. Secure the final wrap near the ground with twine.
6. Wrap twine in wide spirals up the trunk. Secure it by tying above the lower branches.

SPECIAL INFORMATION:

Knot the twine approximately every 10" - 12". This prevents total unwrapping or unwinding of the twine if it should be accidentally cut at any point along the trunk.

REFERENCES:

Pirone, Tree Maintenance



Activity Guide No. 28 — Temporary Cold Frame Construction

TOOLS/EQUIPMENT:

Hand or electric power saw, hammer, square, and level

MATERIALS/SUPPLIES:

Lumber, nails and glass, or plastic sheets, brush and oil base paint, hinges, and putty

PROCEDURES:

1. Level the surface of the ground where temporary frame is to be constructed. Locate it away from the prevailing winds.

* 2. Measure the length and end boards of the frame, so flats from the greenhouse will fit inside without loss of space.

3. Height of the frame should be high enough to permit 8" to 10" of space above the flats in the frame for plant growth.

* 4. Cut frames to fit as covers over the cold frame base. Allow a 1½" overlap. Covers should be slightly sloped toward the sun. This will allow water drainage also. Use glass or plastic only if needed.

5. Place temporary hinges on high side of covers to facilitate ventilation of frames in the spring.

6. Backfill sides of frame (outside) with soil up to 4" - 6" along the sides.

* 7. If necessary, prime coat wood parts with an oil base paint. Putty any holes in wood, if needed.

8. Clean and store tools. Clean the area.

SPECIAL INFORMATION:

Check with the instructor. Additional protection may be needed on top of frames at night during early spring and/or over the winter.

REFERENCES:

Wright, Greenhouse Construction

Activity Guide No. 29 — Using a Cold Frame

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Seedlings in pots or flats

PROCEDURES:

1. Place flats or pots of seedlings that were started in the greenhouse or hotbed into the coldframe. (See note below.)
2. Check all flats or pots; they should be level for uniform watering.
3. Ventilate only to maintain a uniform temperature range of 58-63 degrees.
* 4. If the air temperature outside the coldframe drops to 32 degrees or colder, cover the coldframe with straw mats or other material advised by the instructor.
5. Avoid prolonged periods of direct sunlight on closed frames in the spring. High temperatures prevent seedlings from hardening off.
6. Water early in the day when necessary, so that foliage can dry before the sun sets.
7. Check all broken glass and/or plastic used with cold frame covers. Repair immediately when needed.

SPECIAL INFORMATION:

NOTE: -- Step No. 1: The primary purposes of cold frames are to harden off plants, to root cuttings, and/or to store potted plants over the winter. Ventilation, water, and light are important factors -- use moderation in use of the frame.

REFERENCES:

Kains and McQuesten, Propagation of Plants

Activity Guide No. 30 — Sodding a Lawn Area

TOOLS/EQUIPMENT:

Water ballast roller

MATERIALS/SUPPLIES:

Sod and fine screened soil

PROCEDURES:

1. Prepare the soil properly. (See Grounds Maintenance Guide #18.)
2. Secure some sod by either cutting your own from an established lawn area, or purchase sod from a reliable nursery.
3. Lay sod in strips on top of the prepared soil.
* 4. Fit sod closely together. Stagger the strips so that the length sizes are different as you lay them down.
5. Fill all cracks between the sod stripes with fine screened soil.
6. Soak the fine soil thoroughly with water.
7. Roll sod with a water ballast roller when sod dries enough to walk on.
8. Water every two or three days for the first 3 weeks; then resume a regular watering schedule.

SPECIAL INFORMATION:

Keep cut sod shaded to prevent unnecessary drying prior to placement on the lawn area.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 31 — Spot Type Soil Testing

TOOLS/EQUIPMENT:

Soil test kit and hand trowel, or soil auger

MATERIALS/SUPPLIES:

Soil samples and small plastic bags

PROCEDURES:

1. Spot soil tests can be made in areas that generally have the same soil with common plants and have had the same or routine care over a period of time.

* 2. Take a number of spot samples of soil using a trowel or soil auger so that a representative sample from the top soil and some of the sub-soil at a depth of 10" is secured. A pint soil sample that is placed in a small plastic bag will usually be sufficient for the quick test for N-P-K and pH.

3. Distribute the soil sample on paper toweling, after it is thoroughly and evenly mixed. Allow the sample to dry at room temperature (72 deg.) If the soil is left to dry for more than a few hours, it should be covered with paper toweling to avoid any air borne contaminants.

* 4. Follow the procedures for the N-P-K and pH tests as given in the directions for the kit used. (Ex: Sudbury, simplex, etc.)

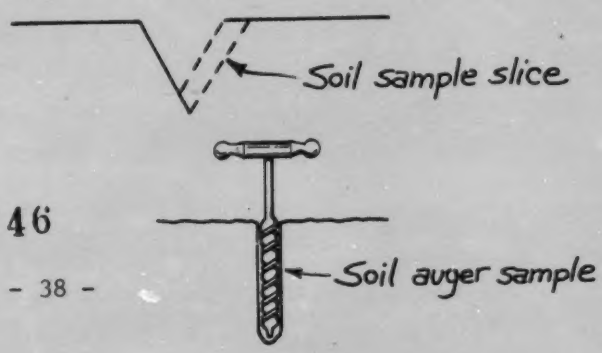
* 5. Write the test results down and prepare lime and/or fertilizer recommendations from the test results. Do not distribute fertilizer or lime until instructor has checked your work. Clean up.

SPECIAL INFORMATION:

Quick tests are based on quantitative results. For more precise or critical tests, the instructor may wish to have the soil tested at a soil laboratory for all major and minor elements.

REFERENCES:

Janick, Horticulture Science
Bear, Soils and Fertilizer



Activity Guide No. 32 — Soil Erosion Control

TOOLS/EQUIPMENT:

Hammer, saw, sledge, and lawn roller

MATERIALS/SUPPLIES:

Wood stakes, (8" x 3/4") burlap, comon nails, plants or grass seed

PROCEDURES:

1. On gently sloping ground, fill in eroded area with fertile soil. Rake smoothly; then press with lawn roller.

2. Lightly seed and rake area. Reseed; rake again and roll with lawn roller.

* 3. Spread burlap over seeded area; then stake down ends and sides. Spray with water daily to encourage fast germination of grass seed.

4. For deep gullies or steep slopes, place temporary "batter" boards across the width of gully or trench at least every three feet of length of gully.

* 5. Fill in with fine gravel, and cover with fertile soil. Plant ground cover suitable for the area. Check with the instructor on type of ground cover to use, then refer to Grounds Maintenance Guide #33.

6. Mulch around ground cover plants with wood chips, peat moss, or heavy plastic.

7. Clean tools and area. Store tools away properly.

SPECIAL INFORMATION:

Typical ground covers used where grass cannot hold soil are: pachysandra, myrtle, juniper, cotoneaster, vetch, etc.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 33 — Ground Cover Placement

TOOLS/EQUIPMENT:

Rake, hand trowel, and nursery spade

MATERIALS/SUPPLIES:

Selected ground cover and wood chips, or peat moss.

PROCEDURES:

* 1. Ground cover usually is used where grass will not grow well; on slopes, or just for its special ornamental effect. Therefore, the ground cover must be carefully selected. Check with your instructor before proceeding.

2. Prepare the soil area for the ground cover as you would for annuals or other shallow-rooted ornamental plants.

3. Score lines in the planting area to mark out the exact spots where each plant will be placed.

4. Carefully plant the ground cover. Firm the soil around the roots in the hole dug by a spade or hand trowel. Lightly water each individual plant put into the ground.

* 5. After the area is completely planted and all plants firmed in the soil, spread a mulch of wood chips or peat moss. Then carefully water until the mulch and soil is moist. Do not over water.

6. Water at least twice a week until the plants are established.

7 Clean tools and area. Store tools and unused wood chips or peat moss.

SPECIAL INFORMATION:

Ground covers are generally quite hardy when established. It is important to take time to plant each plant properly for satisfactory results. Fertilizer may be needed; check with the instructor.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds

Activity Guide No. 34, 35

Use of Insecticides and Herbicides

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Garden supplies catalogs

PROCEDURES:

1. Because of the wide and increasing use of insecticides and herbicides around the grounds and the constant distribution of new commercial brands, the student will become familiar with a few basic materials.

* 2. Prepare a list of the most common commercial insecticides and herbicides found in garden supply catalogs, or other sources such as the garden magazines.

3. Visit a garden supply shop and/or the County Agricultural Agent. List the characteristics of at least ten each insecticides and ten herbicides. Important characteristics should include the safe use of each, the universal adaptation of each, and the kinds of insects, diseases, or plants it will control or kill.

* 4. Select at least two of each from the insecticide and herbicide listing. Be prepared to tell the instructor why you chose the materials over the other materials that you studied.

* 5. Conduct a sample test on plants of the materials selected in Step 4. Follow the directions given commercially. Report the results of the test with your own opinions to the instructor.

SPECIAL INFORMATION:

Working with organic chemicals can be very dangerous. Use proper safety precautions when handling the materials. Protect yourself from skin or eye contact with the chemicals; and work in well ventilated area to avoid fume inhalation.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 36 — Lawn Aeration

TOOLS/EQUIPMENT:

Lawn roller with aerator spikes and lime or fertilizer

MATERIALS/SUPPLIES:

Agricultural lime

PROCEDURES:

1. Mow lawn to a height of 1-1½", and remove excess clippings.
2. Roll lawn in one direction with the spike roller. Overlap the strips slightly. Repeat the spike rolling at a 90-degree direction to cross the lines and holes made by the first rolling operation.
* 3. Fill lime spreader and adjust for rate of flow necessary to correct pH of soil to near a pH level of 6.5. Check with your instructor for directions, and for the amount of lime to use.
4. Water lawn thoroughly once a week unless natural rain maintains proper moisture level.
5. Clean and store roller and spreader.

SPECIAL INFORMATION:

Regular annual liming and fertilizing will assist in maintaining the soil in an aerated condition.

REFERENCES:

Your Lawn and its Care, Bulletin No. 362-A, N.J. Agri. Ext. Ser.

Activity Guide No. 37 — Thatch Control

TOOLS/EQUIPMENT:

Heavy iron rake, power mower, and aerator

MATERIALS/SUPPLIES:

Fertilizer and lime when needed

PROCEDURES:

1. Thatch is caused primarily by the accumulation of grass, roots, twigs, and other small plant materials around the base of lawn grasses.

* 2. Determine the seriousness of the thatch problem. It may be necessary to do the entire area of the lawn.

3. Usually, a heavy raking with an iron rake will remove the excess buildup of the plant materials. Several mowings and more raking will clean up the problem.

* 4. Aerate the soil area with a weighted spike roller. Lime, fertilizer, and seed bare spots with new grass. (See Guide No. 5).

5. To avoid or to cut down on thatching, use a grass catcher, or rake up grass clippings after mowing. Cutting more often with shorter clippings may also avoid the problem.

6. Clean and store tools.

7. Observe condition of lawn area for at least three months.

SPECIAL INFORMATION:

Sometimes certain weeds help to create a thatching problem. Use a weed chemical suggested by the instructor, if this is a possible cause.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.

GROUNDS MAINTENANCE

Activity Guide No. 38 — Proper Grass Mowing

TOOLS/EQUIPMENT:

Rotary lawnmower, spring rake, and grinder.

MATERIALS/SUPPLIES:

Gasoline (in safety can)

PROCEDURES:

1. Decide on the height of mowing, by determining the dominant species of grass in the lawn.
* 2. Sharpen lawnmower blade if needed. See note below.
3. Set lawnmower blade to the proper height for cutting. See note below.
4. Cut lawn in strips the length of the area.
5. Cut by overlapping 4 to 6 inches on preceding cut strip.
6. Rake cut areas to remove grass clippings.
* 7. Clean lawn mower, and dispose of clippings properly.

SPECIAL INFORMATION:

For a good lawn, the grass should be cut frequently, when 1/2 inch of grass is above the proper growing height.

SAFETY: Disconnect spark plug wire when making any adjustments to the mower. Do not add gasoline if engine is hot.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 39 — Hedge Trimming

TOOLS/EQUIPMENT:

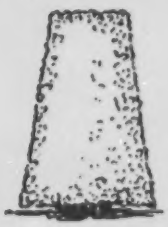
Trimming shears, grinder, or hone stone

MATERIALS/SUPPLIES:

Oil

PROCEDURES:

1. Sharpen and oil a pair of trimming shears. (See note below).
2. Remove any dead, diseased, or broken branches.
3. Eyeball the branches. Decide which branches will be removed.
* 4. Shape hedge so that it is narrower at the top than at the bottom with the sides sloping outward.
5. Clean, oil, and store trimming shears.
6. Clean up and dispose of all clippings.



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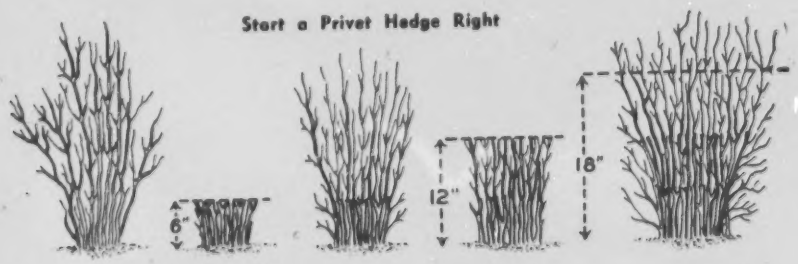
SPECIAL INFORMATION:

See Guide No. 2 in Horticultural Mechanics for instructions on sharpening trimming shears.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.



GROUNDS MAINTENANCE

Activity Guide No. 40 — Composting

TOOLS/EQUIPMENT:

Spade, tamping tool

MATERIALS/SUPPLIES:

Manure, leaves, loam soil, lime, fertilizer, and organic garden waste

PROCEDURES:

1. Pick a suitable area to make a compost pile.
* 2. Make 3- or 4-inch equal layers of leaves, manure, organic waste, and loam soil piled on top of each other.
3. Keep repeating Step #2 until the pile is about 5 feet high.
4. Tamp down each layer before the next one is added.
5. Make each pile dip slightly inward to cause rain water to stay within the pile.
* 6. Add lime once a month to encourage decomposition.
7. Spade the pile over every 6 to 8 weeks during the summer.
* 8. Distribute 5-10-5 fertilizer at least once a year at rate advised by instructor.

SPECIAL INFORMATION:

Diseased plants should not be composted.

REFERENCES:

Conover, Grounds Maintenance Handbook

Activity Guide No. 41 — Lining Out Nursery Stock and Container Stock

TOOLS/EQUIPMENT:

Rototiller, nursery spade, rake and garden hose

MATERIALS/SUPPLIES:

Wood chips or peat moss and water

PROCEDURES:

1. Young nursery stock will develop more rapidly when placed out in the field in rows or in container stock. Therefore, select all young evergreen or deciduous seedlings for lining out when the seedlings are from 6" to 12" tall.

* 2. Prepare the field with a rototiller for deep (14"-18") tillage. This permits the young roots to get established more readily.

3. Dig a trench for the seedling stock with a machine or by hand. Plant each seedling at least 16" apart and preferably 18" apart in the rows. Firm the soil around each plant and water thoroughly.

4. Mulch to a depth of at least 2" with wood chips, or at least 1½" with peat moss. This will help maintain moisture and control weeds.

5. For container stock, mulch first and place container stock on top. Container stock may be placed 12" apart since it is readily moved as the seedlings grow. Water regularly at least twice a week.

6. If shearing or pruning is necessary, check with the instructor.

7. Clean and store equipment.

SPECIAL INFORMATION:

If the quantity of container stock is small, it may be profitable to erect a lath shading to cool and help reduce water loss from the stock. Check with the instructor.

REFERENCES:

Janick, Horticulture Science

GROUNDS MAINTENANCE

Activity Guide No. 42 — Shrub Fertilization

TOOLS/EQUIPMENT:

Spring rake

MATERIALS/SUPPLIES:

Fertilizer (5-10-5)

PROCEDURES:

1. Select the shrub that needs to be fertilized.
2. Decide how much fertilizer is needed to be effective.
* 3. Apply proper amount around the base of the shrub, by sprinkling it in handfuls.
4. Lightly rake into soil. The fertilizer should be evenly distributed.
5. Water thoroughly.
* 6. Shrubs that are over 10' high and established over six years should have fertilizer holes placed around base. See instructor for directions.

SPECIAL INFORMATION:

Light, sandy soils may need large amounts of fertilizer to be effective.

REFERENCES:

Janick, Horticultural Science.
Hoover, Approved Practices in Beautifying the Home Grounds.

II. GREENHOUSE AREA

PROPAGATION OF ORNAMENTAL TREES AND SHRUBS

GREENHOUSE

Activity Guide No. 1 — Mixing Soil

TOOLS/EQUIPMENT:

Round-tipped shovel and 5'x5' hard-surfaced level area

MATERIALS/SUPPLIES:

Sand, loam soil, and peat moss.

PROCEDURES:

1. Determine how much potting soil will be needed.
2. Screen the sand and peat moss to eliminate all large particles.
3. Measure out a 1/3 part of sand of the total mixture.
4. Measure out a 1/3 part of loam soil of the total mixture.
* 5. Measure out a 1/3 part of peat moss of the total mixture.
6. Place the three equally measured ingredients into a layered pile, on the 5'x5' hard surfaced level area.
* 7. Carefully turn with round-tipped shovel until evenly mixed.
8. Water lightly to settle dust and to put mix in better working condition.

SPECIAL INFORMATION:

For large scale operations, a power-driven cement mixer or soil shredder can be used for mixing. Soil should be mixed 24 hours previous to use to insure that the moisture is equalized throughout the mixture.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 2 — Germination Test

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Blotting paper and a shallow pan or dish

PROCEDURES:

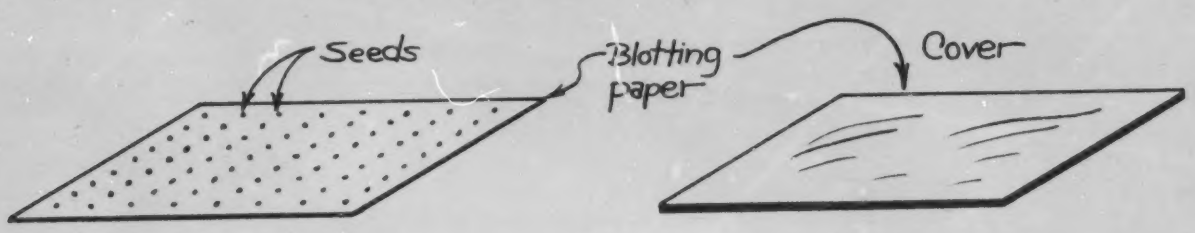
1. Count 100 seeds at random from the seed to be tested.
2. Inspect the seed to determine freshness by appearance and smell.
3. Prepare the blotting paper by cutting [illegible] pieces 8" x 8" square.
4. Soak the paper in clean water (preferably distilled), and allow it to drain by hanging the blotting paper over a sink, or drain it until the excess water is removed.
5. * Carefully place the selected seeds (No. 1 above) on the blotting paper in evenly spaced rows with the outer rows of seeds at least 1/2 inch in from the edges of the blotting paper.
6. Carefully place the second moist blotting paper over the seeds. Gently firm the blotting down with your fingertips to insure contact with the seeds.
7. Place the blotting paper with the seeds enclosed on a tray, dish, or pan in a shaded, warm (72-75 degrees) place.
8. When seeds have germinated, calculate the percent germination.

SPECIAL INFORMATION:

Remember, the number of seeds that germinated from the 100 placed on the blotting paper will be the exact percentage of germination for that seed tested.

REFERENCES:

Kains and McQueston, Propagation of Plants



Activity Guide No. 3 — Sowing Seed

TOOLS/EQUIPMENT:

Fresh garden seed, identification labels

MATERIALS/SUPPLIES:

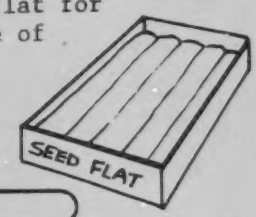
Seed flat prepared with proper germination media and wood firming block.

PROCEDURES:

1. Prepare a seed flat using the proper procedures learned, or review Guide No. 1. Media should be damp, but not too wet.
2. Check packet of seed for freshness, or run germination test. See Guide No. 2.
3. Prepare wood or plastic identification label with variety name, date, and your initials. See Guide No. 26.
* 4. Carefully read any special seed sowing instructions on packet.
5. Sow seed evenly on surface of the seed flat or in furrows.
* 6. Cover seed to depth recommended for the variety. Use same type of seed media or media suggested by instructor.
7. After firming the media with a wood block, carefully spray a fine mist of water on flat to moisten, but not flood, seedling flat.
8. Place identification label in the flat, and place the flat on germinating bench or in an area advised by the instructor.
* 9. Clean the area, and store used seed and media.

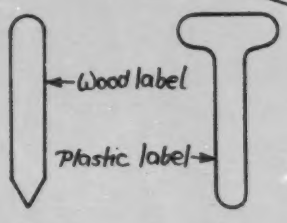
SPECIAL INFORMATION:

Use only clean, pasteurized soil (Guide No. 19). Check flat for strength and durability. If possible, print variety name of seed on the flat.



REFERENCES:

Kains and McQueston, Propagation of Plants



GREENHOUSE

Activity Guide No. 4 — Transplanting Seedlings

TOOLS/EQUIPMENT:

Transplant flat and wooden dibble

MATERIALS/SUPPLIES:

Seedlings

PROCEDURES:

1. Prepare a transplant flat with proper soil mixture. See note below.

* 2. Make holes in soil of transplant flat 1 to 2 inches apart with a wooden dibble.

3. Carefully lift seedlings without disturbing their root systems.

4. Place seedlings into holes made by the dibble, and press firmly around the seedlings to eliminate any air pockets around them.

5. Water the flat thoroughly. Refer to Greenhouse Activity Guide No. 23 for watering.)

SPECIAL INFORMATION:

Keep the flats shaded, moist, and at a low temperature for the first few days.

Refer to Activity Guide No. 1, Greenhouse, for preparing soil mixture in Step No. 1.

REFERENCES:

Kains & McQueston, Propagation of Plants.
Nelson, Flower and Plant Production in the Greenhouse.
Hartmann and Kester, Plant Propagation Principles and Practices.

GREENHOUSE

Activity Guide No. 5 — Fertilizing Transplants

TOOLS/EQUIPMENT:

Water can or fertilizer adapter for garden hose

MATERIALS/SUPPLIES:

Soluble fertilizer

PROCEDURES:

1. After transplanted seedlings are established in the market packs, flats, or greenhouse beds, determine the amount and strength of fertilizer mix needed.

* 2. Mix the soluble fertilizer in a clean water can, or put the proper amount of soluble fertilizer in a container that attaches to a garden hose.

3. Apply the liquid solution of fertilizer to the soil surface to moisten the first 1" of soil around the transplanted seedlings. Additional watering will distribute it down around the roots over a few days.

* 4. With the automatic sprayer that is attached to the garden hose, determine the rate of mix and set the gauge before turning on the water. Following the same procedure in Step No. 3, fertilize the transplanted seedlings.

5. Clean and store equipment.

SPECIAL INFORMATION:

Liquid fertilizer solutions are intended for quick feedings of plants. Since the fertilizer is soluble rather quickly, it will not be available for a long period. It may be necessary to add additional dry (more slowly available) fertilizers to the transplants. Check with instructor.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 6 — Pinching Back

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

NONE

PROCEDURES:

* 1. Pinching back is the term used when lateral or axil shoots are removed from certain flowering plants. It causes some foliage plants to produce dense growth, with low height, or fewer flowers but larger flowers. Therefore, determine the purpose of pinching back on the crop before doing it.

2. To encourage larger flowers, with your fingers pinch back the side axil or lateral flower buds.

* 3. To encourage denser and lower growth of foliage plants, pinch back stems at the terminal and lateral areas to the nearest node point.

4. Disbudding may have to be done several times over a period of weeks to discourage side flower buds.

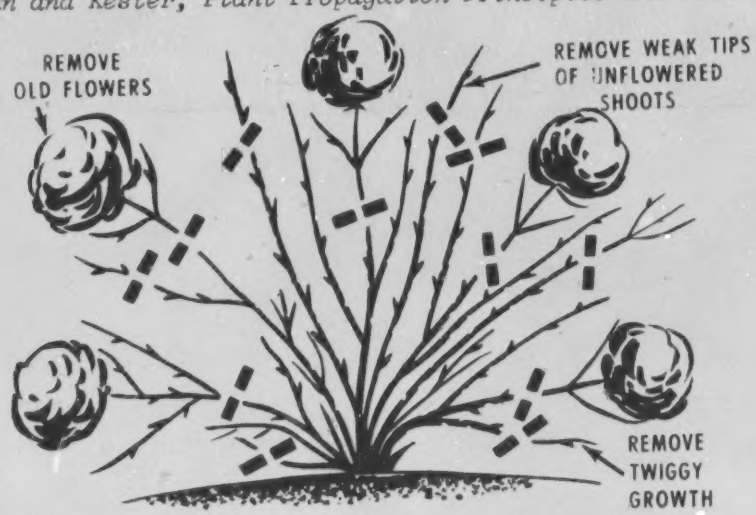
5. Pinching back of foliage plants need be done only to maintain the desired density or height of plant.

SPECIAL INFORMATION:

If pinching cannot be done easily with the fingers, use a pair of small florist scissors so as to avoid ragged cuts.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices



Activity Guide No. 7 — Application of Hormones on Cuttings

TOOLS/EQUIPMENT:

Knife

MATERIALS/SUPPLIES:

Geranium cuttings and Rootone (trade name for hormone)

PROCEDURES:

1. Make a trench in the rooting medium.
2. Remove needed amount of Rootone from its container, and place it in a separate sterile container.
3. Make all the bases of the geranium cuttings even by using a knife. (See note below).
4. Dip cuttings into the container where the Rootone is, and rotate the bases so the Rootone is evenly applied.
5. * Shake off excess Rootone powder.
6. Insert the cuttings immediately into the trench in the rooting medium. Avoid brushing Rootone off.
7. Press firmly around cuttings to eliminate any air pockets that may be around them.
8. Water thoroughly and keep moist.

SPECIAL INFORMATION:

Different strength hormones are used according to the cuttings ability to root.

Step No. 3, always use a clean knife to cut plant material.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices.
Nelson, Flower and Plant Production in the Greenhouse.

Activity Guide No. 8

T-Budding

TOOLS/EQUIPMENT:

Sharp knife

MATERIALS/SUPPLIES:

Budding rubber bud and stock

PROCEDURES:

1. Choose an area 2 to 10 inches above soil level in a smooth bark surface on the stock plant.

2. Stock preparation:
   a) Make a vertical cut about one inch long in the stock.
   b) Make a horizontal cut about 1/3 the width of the stock at the top of the vertical cut. A twist of the knife will open the flaps that were formed.

3. Bud preparation:
   a) Make a cut about 1/2-inch under the bud, starting below the bud and passing the bud above it by 1-inch.
   b) Make a horizontal cut of 3/4-inch above the bud into the wood, thus making it possible to remove the bud piece.

* 4. Insert the bud piece into the two flaps on the stock by pushing it down into it. Be sure the horizontal cuts on the bud piece and stock are even.

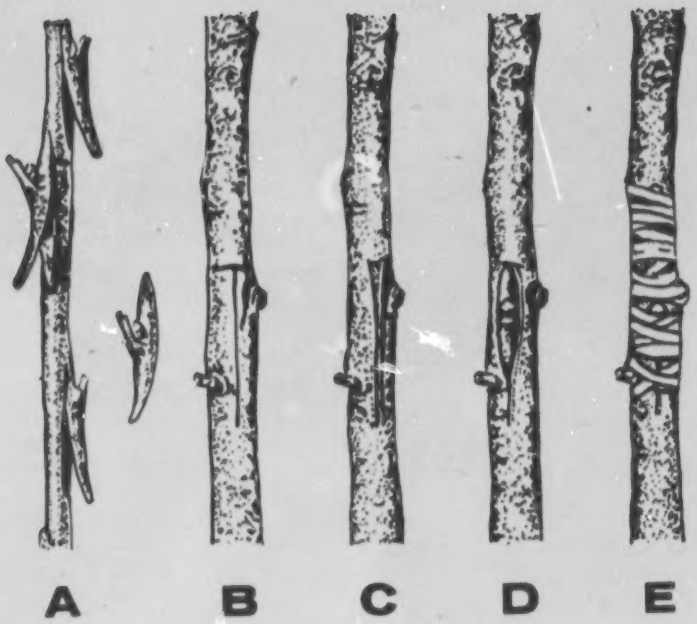
5. Wrap the union with a budding rubber snugly with only the bud showing.

SPECIAL INFORMATION:

The budding rubber will deteriorate within a few weeks, but the bud should have enough time to heal itself.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices



BUD GRAFTING

A, Bud stick; *B*, T-shaped cut in bark of the stock; *C*, bark raised along both sides of the cut; *D*, bud inserted; *E*, completed bud graft bound with a rubber band to prevent drying.

Activity Guide No. 9 — Patch Budding

TOOLS/EQUIPMENT:

Double-bladed knife

MATERIALS/SUPPLIES:

Nurserymen adhesive tape, stock plant, bud

PROCEDURES:

1. Choose an area 2- to 10-inches above soil level on a smooth bark surface on the stock plant.
2. Choose a suitable bud.
3. Stock preparation:
   a) Use a double-bladed knife to make 2 parallel cuts about 1/3 the way around the stock where the bud will be transferred to.
   b) Make 2 vertical cuts forming a rectangular patch on the stock.
4. Bud preparation:
   a) Use a double-bladed knife to make 2 parallel cuts around the bud about 1/3 the way around the stock.
   b) Make 2 vertical cuts forming a completed rectangular patch around bud.
   c) Slide bud patch off to one side.
5. Remove the patch of bark on the stock.
* 6. Insert bud patch to stock. Fit all four sides snuggly in place.
7. Wrap the bud patch snuggly to the stock with the nurseryman's adhesive tape. Leave only the bud exposed.

SPECIAL INFORMATION:

In ten days, cut the tape around bud patch, but do not remove it. Check with instructor.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 10

Root Cuttings of Delicate Roots

TOOLS/EQUIPMENT:

Knife

MATERIALS/SUPPLIES:

Flats, sand, and raspberry roots

PROCEDURES:

1. Prepare required number of flats by filling them up to within an inch of the top with sand.
2. Using a knife, carefully cut roots into short lengths, 1 to 2 inches long.
* 3. Scatter the cut roots horizontally over the surface of the sand.
4. Cover roots with ½ inch layer of sand.
5. Water thoroughly until completely moist.
* 6. Cover flats with a polyethylene cover to prevent drying out.
7. Place flats in a shaded area, and adventitious shoots will soon develop.

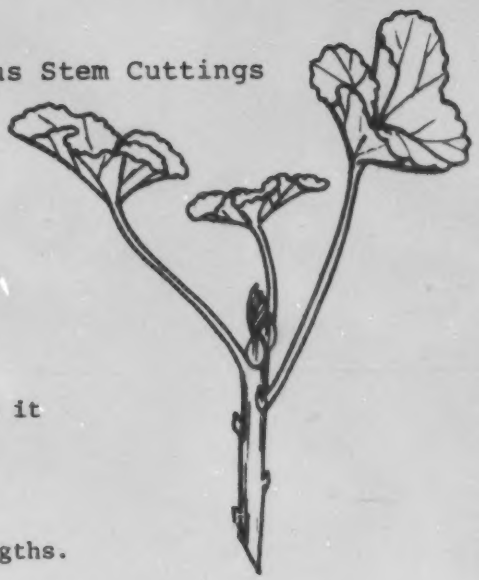
SPECIAL INFORMATION:

Provide shade or northern light. Avoid direct sunlight until shoots develop.

REFERENCES:

Janick, Horticultural Science.
Hartmann and Kester, Plant Propagation Principles and Practices.

Activity Guide No. 11 — Herbaceous Stem Cuttings



TOOLS/EQUIPMENT:

Sharp knife

MATERIALS/SUPPLIES:

Geranium stems, flats with rooting medium in it

PROCEDURES:

1. Cut Geranium stems into 3- to 5-inch lengths.
2. Remove lower leaves from stems leaving only 3 or 4 leaves at the top.
3. Make a clean, angled cut at the base of the stem with a sharp knife. Avoid bruising or injuring the base of the stem; it could provide an entry for decay organisms.
* 4. Use a commercial preparation that stimulates root growth by dipping the base of stem into the powder. See Guide #7, Greenhouse.
5. Make a slit into rooting medium with a knife.
6. Insert cuttings into rooting medium. Avoid overlapping of leaves, and constantly keep the cuttings damp and away from direct sunlight.
7. Press firmly around cuttings to eliminate air pockets.
8. Water thoroughly, and keep moist.
9. Place the flat in a shady location. Keep it away from full sunlight.

SPECIAL INFORMATION:

Cuttings should be lightly sprinkled with water frequently, and kept at a high level of humidity.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 12 — Leaf Cuttings

TOOLS/EQUIPMENT:

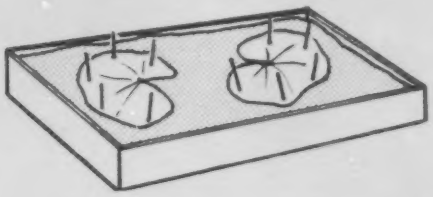
Sharp knife and flat

MATERIALS/SUPPLIES:

Peat moss, Begonia rex plant, and toothpicks

PROCEDURES:

1. Prepare a flat of peat moss, and fill to within 1/2-inch of the top.
2. Cut the Begonia rex mature leaves on the veins of their undersurface.
3. Lay leaves down with the natural upper surface exposed. Be sure that the areas where the veins are cut come in contact with the peat moss in the flat.
* 4. Place 4 or 5 toothpicks vertically through the outer edge of the leaf to hold it in place.
5. Water thoroughly, and keep it moist.
6. Move the flats to a shaded area. Keep it out of direct sunlight.



SPECIAL INFORMATION:

New plants will form where the vein was cut, and the old leaf blade will gradually disintegrate.

REFERENCES:

Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 13 — Tip Layering

TOOLS/EQUIPMENT:

Trowel

MATERIALS/SUPPLIES:

Black raspberry plant or forsythia

PROCEDURES:

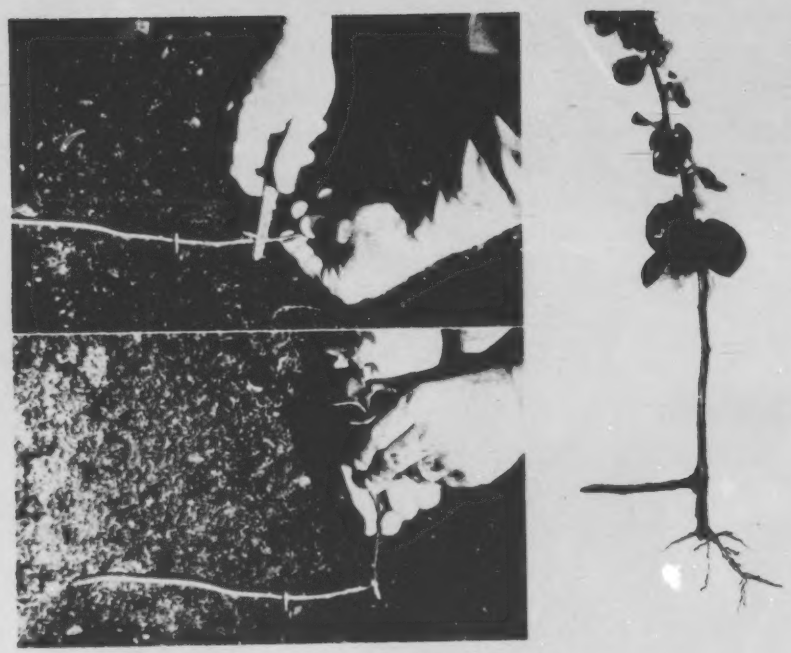
1. Carefully inspect the stock plant to be sure it is the proper time of year for layering. The terminal ends should be elongated and the leaves small and curled. The best time is when only part of the lateral tips have become elongated.
2. Dig a hole with a hand trowel 3 or 4 inches deep alongside the plant. For larger operations, a furrow may be plowed.
3. Insert the end of the shoot into the hole.
* 4. Cover the shoot tip with soil and eliminate all air pockets around the shoot.
5. Water thoroughly and keep moist.

SPECIAL INFORMATION:

Note that the new rooted tip consists of a terminal bud, a mass of roots, and a few inches of the old cane.

REFERENCES:

Janick, Horticultural Science.
Hartmann and Kester, Plant Propagation Principles and Practices.



SIMPLE LAYERING

Upper left: Wounding the branch. *Lower left*: Bending the tip of the branch upright. *Right*: Rooted branch cut free from parent plant.

BM-1684

Taping plastic sheeting around an air-layered branch to make a tight package.

Activity Guide No. 14 — Air Layering

TOOLS/EQUIPMENT:

Sharp knife

MATERIALS/SUPPLIES:

10" square piece of polyethylene film, 2 budding rubbers, sphagnum moss, and a rubber plant (Ficus elastica)

PROCEDURES:

1. Girdle the bark of the stem at the desired point of air layering.
* 2. Scrape exposed surface well to remove the cambium and phloem layers.
3. Apply about two handfuls of slightly moist sphagnum moss around the stem to enclose the cut surfaces.
4. Wrap a 10-inch square piece of polyethylene film around the sphagnum moss to cover it completely.
5. Twist both ends of polyethelene film to insure that no water can seep inside.
6. Tie a budding rubber around each end of the polyethylene film, so that they are fastened securely.
* 7. If root promoting hormone is required, check with instructor before using the hormone.

SPECIAL INFORMATION:

Rooting usually occurs in a few months, and the removal of the rooted layer should be done when the plant is not actively growing. Special precautions should be taken to ensure proper growth, since the plant is out of balance with more top growth than root growth.

REFERENCES:

Janick, Horticultural Science.
Hartmann and Kester, Plant Propagation Principles and Practices.

Activity Guide No. 15 — Soil Pasteurization

TOOLS/EQUIPMENT:

Steam supply, porous canvas hoses, vinyl covering, and soil thermometers.

MATERIALS/SUPPLIES:

Soil and water

PROCEDURES:

1. Determine how much soil needs to be pasteurized. Move the soil to a bench top.
2. Moisten all of the soil. Remember, moist soil conducts steam better than dry soil.
3. Apply any organic matter or fertilizer to the soil before steaming.
4. Lay a porous canvas hose in the middle of the bench under the soil for the length of the soil that is to be pasteurized.
* 5. Connect the porous canvas hose to the steam supply.
6. Lay a vinyl cover over the top of the bench.
7. Tie cover down on edges to prevent steam blowouts.
8. Place soil thermometers at various locations in the bench to be sure of uniform soil temperatures.
9. Turn steam on, and let the soil heat to 180 degrees for 30 minutes.

SPECIAL INFORMATION:

SAFETY: Steam can cause serious scalding. Follow all approved safety practices.

REFERENCES:

Janick, Horticulture Science.
Hartmann and Kester, Plant Propagation Principles and Practices.

Activity Guide No. 16 — Potting Hanging Plants

TOOLS/EQUIPMENT:

Wooden dibble

MATERIALS/SUPPLIES:

Hanging basket, rooted cuttings, water, and potting mixture

PROCEDURES:

1. Determine and select the rooted cuttings that will do best in a hanging basket.
2. Fill hanging basket to within 1/2-inch from top with good potting mixture. Refer to Guide No. 1, Greenhouse.
* 3. Make proper sized holes along the perimeter of the hanging basket with a wooden dibble. Holes should be about one inch from the side of the pot and about four to five inches away from each other going in a circular direction.
4. Place rooted cuttings in the holes with their growth facing toward the outer perimeter of the hanging basket.
5. Press firmly around each rooted cutting to eliminate any air pockets.
6. Water thoroughly and keep moist.
7. Keep in shade and out of direct sunlight until they are established.

SPECIAL INFORMATION:

Trimming will increase the amount of branching and make the plant fuller.

REFERENCES:

Nelson, Flower and Plant Production in the Greenhouse

Activity Guide No. 17 — Potting Bulbs

TOOLS/EQUIPMENT:

Hand trowel

MATERIALS/SUPPLIES:

Pots, potting mixture and bulbs.

PROCEDURES:

1. Determine the kind, size, and number of bulbs to go into each pot. Be sure the pot has drainage holes on the bottom.
2. Fill pot with 1½ to 2 inches of potting mixture. The amount of potting mixture depends on size of the bulb and size of the pot. Enough room should be allowed for root growth. See note below.
* 3. Place the bulb in the center of the pot with the basal end toward the bottom of the pot.
4. Place potting mixture around the bulb. Cover the bulb with at least 1 inch of potting mixture. Firm the soil with fingers.
* 5. Soak thoroughly, and store in cold frame for root growth.

SPECIAL INFORMATION:

Refer to Greenhouse Guide No. 1, Mixing Soil

REFERENCES:

Janick, Horticultural Science.
Hartmann and Kester, Plant Propagation Principles and Practices

Activity Guide No. 18 — Watering Plants

TOOLS/EQUIPMENT:

Greenhouse hose and equipment

MATERIALS/SUPPLIES:

NONE

PROCEDURES:

* 1. Water all greenhouse bench plants directly on the surface of soil; use a fan-type sprinkler or disperser head to break up the force of the water. Adjust water flow to avoid heavy soil washing; also avoid wetting foliage. Stop watering when water seeps out the bottom and/or sides of the bench.

* 2. Potted plants should be on a gravel base in the bench. Use a low-pressure water supply, and carefully fill the space between the top of the pot and the soil surface (approximately 1/2" in depth). Water twice to insure that soil in each pot has received sufficient water.

3. Flat stock (seedlings) may be mist sprayed with water until soil is moist and excess water begins to seep from bottom and sides of the flat.

4. At periods between watering of greenhouse plants, it helps to thoroughly wet down walks and under benches to maintain a high humidity to reduce transpiration of water from foliage.

5. Store sprinkler heads and coil hose on proper rack or reel. Do not allow hose to remain on walks or be filled with water, particularly water under pressure.

SPECIAL INFORMATION:

If the water supply tends to be very cold, it may be necessary to temper it with a mixture of warm water. Keeping a large drum of water in the greenhouse for special purposes where cold water is harmful to plants will be useful. The solar heat will temper the cold water placed in the drum.

Activity Guide No. 19 — Plant Identification

TOOLS/EQUIPMENT:

Garden catalogs of nursery/greenhouse plants and Bailey's Cyclopedia of Horticulture

MATERIALS/SUPPLIES:

NONE

PROCEDURES:

1. Prepare a 4" x 6" file card with space for the botanical and common name of a plant, its chief physical characteristics, and its growth requirements.

2. Include space on the card for [illegible]tion on common diseases and insects that affect the plant a[illegible]ll as its normal soil and nutrient requirements.

* 3. Identify all the plants in the greenhouse selected by the instructor by filling out a card for each plant and checking the information in a nursery or greenhouse plant catalog, or in Bailey's Cyclopedia of Horticulture.

4. Be prepared to tell the instructor some unique characteristics of each plant studied.

5. Complete cards by listing the ornamental value of the plant in terms of market use such as cut flowers, foliage, both foliage and cut flowers, outside plantings, house plants, flower arrangements, etc.

SPECIAL INFORMATION:

A student of horticulture will find the file cards very useful in remembering plants in an organized manner. They can also be used to help flower or foliage plantings, or to raise plants for arrangements.

REFERENCES:

Bailey's Cyclopedia of Horticulture, Vols. I, II, and III

Activity Guide No. 20 — Procedure for Labeling Plants

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Grease pencil and plastic label.

PROCEDURES:

1. Determine the plant or seed containers that will be labeled.
2. Using a grease pencil, take a clean plastic label and write the following on it:
   a) Common name of plant.
   b) Scientific name, including genus, species, and variety of plant.
   c) Date of planting.
   d) Name of person who is planting.
* 3. Place completed label in clear sight located within the plants represented.
4. When additional special instruction or information is required, a larger label or two labels should be used.

SPECIAL INFORMATION:

Any additional information such as transplant dates should be added accordingly.

REFERENCES:

Nelson, Flower and Plant Production in the Greenhouse.
Hartmann and Kester, Plant Propagation Principles and Practices.

Activity Guide No. 21 — Repotting

TOOLS/EQUIPMENT:

Hand trowel

MATERIALS/SUPPLIES:

Flower pot, potted plant, water, and potting mixture.

PROCEDURES:

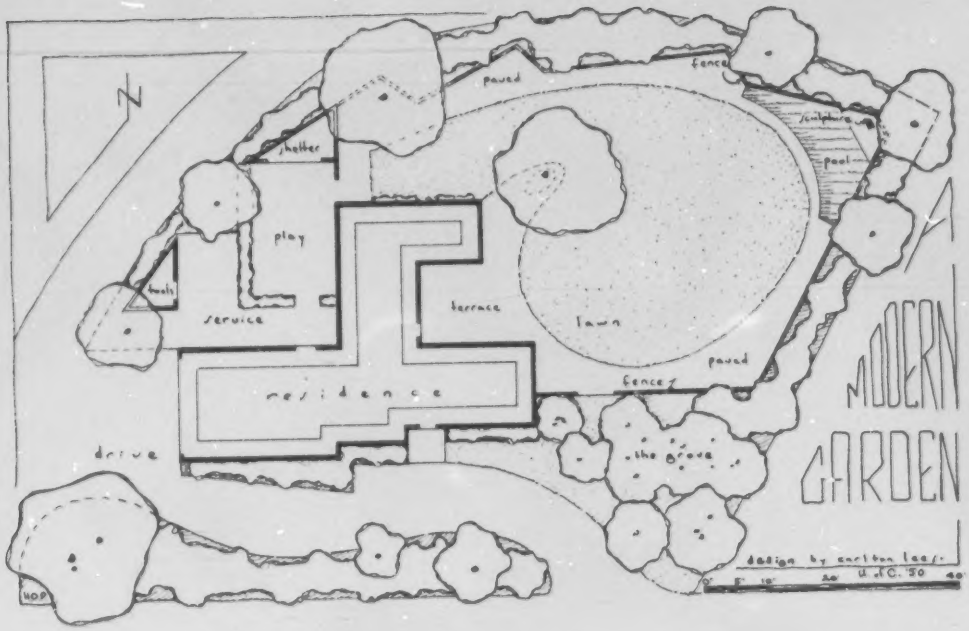
1. Determine proper size of pot that is needed. Observe root growth and growth rate of plant.
2. Fill the new pot with potting mixture, so that its new depth is the same as in the old pot. Remove soil for backfilling.
3. Remove the plant from the old pot by inverting the plant with one hand over the soil. The plant becomes loose from the pot when the rim of the pot is tapped on the edge of the bench. Remember, don't disturb the root system.
* 4. Carefully center the plant in the new pot. See note below.
5. Backfill with potting mixture; pack it firmly around the sides of the pot.
6. Water thoroughly and keep it moist for about ten days until the plant is thoroughly established. Regular watering should be done after the plant is established.

SPECIAL INFORMATION:

In Step 4, gravel or broken pieces of clay pot may be needed on bottom of new pot to encourage proper drainage.

REFERENCES:

Nelson, Flower and Plant Production in the Greenhouse



III. LANDSCAPING AREA

Activity Guide No. 1 — Landscape Symbols

TOOLS/EQUIPMENT:

Drawing board, T-square, 45° triangle, 12-inch scale, and pencil (2-H)

MATERIALS/SUPPLIES:

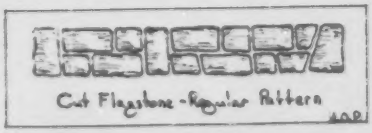
Architect drawing paper and 1/2" roll of masking tape.

PROCEDURES:

1. Review standard symbols for trees, shrubs, hedges, walks, drives. and buildings.

2. Set architect drawing paper up on drawing board properly. Be sure to align paper so horizontal and vertical lines are parallel to the top, bottom, and sides of board.

* 3. Draw to 1/4" scale by using symbols of the following in a plot plan: (See note below).
   a) 30' wide Maple tree
   b) 6' wide Lilac shrub
   c) 15' wide Pine tree
   d) 4' wide Arbovitae shrub
   e) 30' long x 3' wide formal hedge
   f) 20' long x 3' wide informal hedge
   g) 20' long x 8' wide drive
   h) 24' long x 4' wide walk
   i) 42' long x 24' wide house



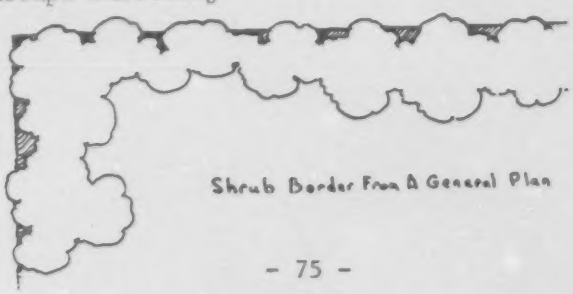
4. Check with your text book to be sure the proper symbols were used.

SPECIAL INFORMATION:

In Step No. 3, landscape design symbols may be produced from a commercial template if instructor gives permission.

REFERENCES:

Black, Landscape Sketching



Activity Guide No. 2

Measurements

TOOLS/EQUIPMENT:

100' steel surveyor tape

MATERIALS/SUPPLIES:

1/4" quadrille paper, architect tracing paper, 3-H pencil, and notebook.

PROCEDURES:

* 1. Visit site of proposed landscape project. Make notes on the physical features of the site: Type of building(s), slope of land in percent, walks, driveways, curbs, water lines, large trees, shrubs, and any other features that will remain.

2. Using the 100' tape, note the distance in feet of the perimeter of the property, or the area that is to be landscaped.

3. Rough sketch in notebook the measurements of building foundation, walks, drives, and other features such as patios.

4. Note the size of doors and windows in buildings and their locations. Include height of window from ground level.

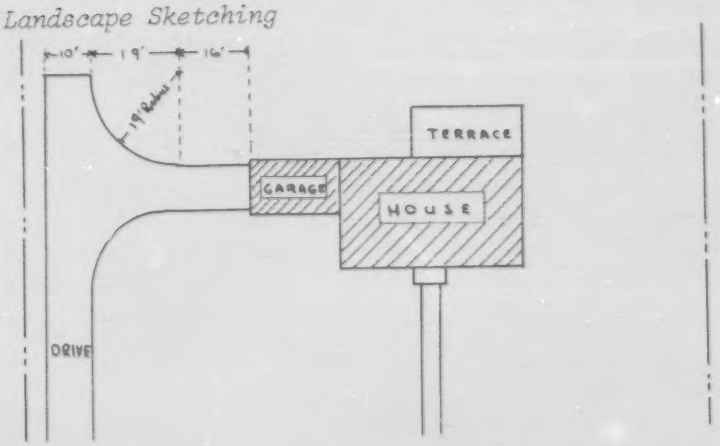
5. Locate by measurement other features such as water faucets, cellar entrances, overhangs, etc.

6. Note any other features that will affect the final design such as large rock formations, fireplace (exterior) retaining walls, etc.

* 7. Later after site visitation, prepare an initial 1/4" scale drawing of the landscape site from the notes taken during the site visit. Review with instructor.

REFERENCES:

Black, Landscape Sketching



Activity Guide No. 3 — Scale

TOOLS/EQUIPMENT:

Drawing board, T-square, 45° triangle, 12" scale, and pencil (3-H).

MATERIALS/SUPPLIES:

Graph paper and 1/2" role of masking tape.

PROCEDURES:

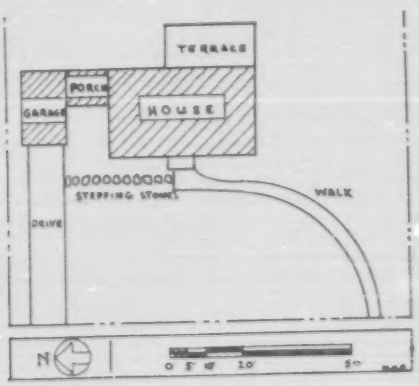
1. Set architect drawing paper up on drawing board properly. Be sure to align paper so horizontal and vertical lines are parallel to the top, bottom, and sides of board.
2. Review scale and measurement from class notes.
* 3. Using a 100' metal tape measure, measure the diameter of the branch spread of at least five trees and five shrubs nearby.
4. Draw on the architect drawing paper the proper scale drawing of these ten plants using a 1/4" scale.
5. Label plants, and supply the proper measurements on drawing.
* 6. Review with instructor.

SPECIAL INFORMATION:

Keep point sharp on drawing pencil

REFERENCES:

Black, Lanascape Sketching



LANDSCAPING

Activity Guide No. 4 — Determining Landscape Needs

TOOLS/EQUIPMENT:

MATERIALS/SUPPLIES:

Notebook and pencil

PROCEDURES:

1. Visit the landscape site, and interview the property owner to determine the types of trees, shrubs and flowers the owner would like on his property.

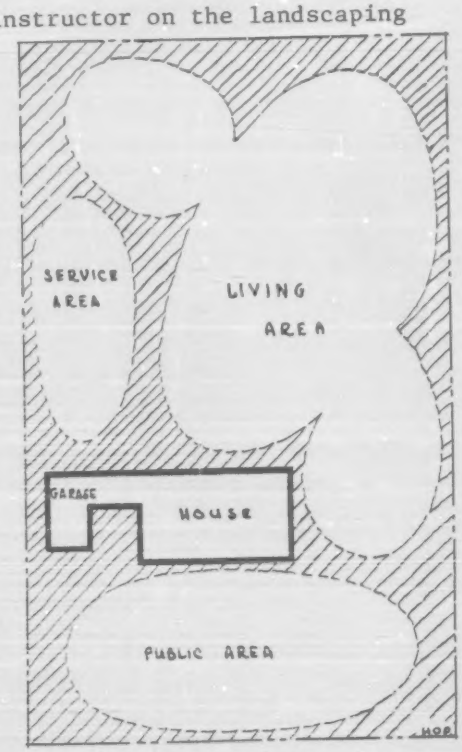
2. List the names and variety of trees, shrubs and flowers desired by the owner as well as other residents of the property.

3. Ask about the service area needs of the site. Locate the parking spaces required and the size and location of walks, driveways, fencing, retaining walls, flower or vegetable garden areas, patios, and other garden structures or features.

4. Check the terrain for fill, grading, or drainage needs. Keep notes.

5. Determine the cost limits of the owner.

* 6. Prepare a report to submit to the instructor on the landscaping needs of the property visited.



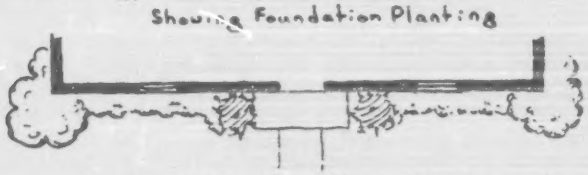
SPECIAL INFORMATION:

Before visit to property, prepare a check list of typical items considered in landscape design. This will save time and avoid forgetting important factors that are needed to finish a design.

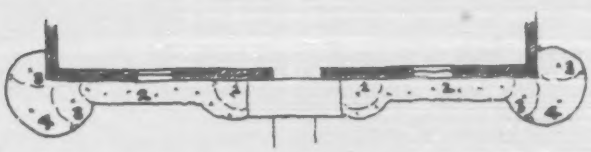
REFERENCES:

Black, Landscape Sketching

A. Front Elevation Of House
Showing Foundation Planting



B. Plan Showing Shrub Arrangement



C. Development Of Planting Areas
H.O.P.

Activity Guide No. 5 — Drawing a Plan

TOOLS/EQUIPMENT:

Drawing board, T-square, set of triangles, 12" scale, french curves, notebook, and pencil (3-H).

MATERIALS/SUPPLIES:

1/4" scale quadrille paper, architect tracing paper, and 1/2" roll of masking tape.

PROCEDURES:

1. Place 1/4" scale quadrille paper on drawing board. Fix it with drafting (masking) tape at corner. Align paper so horizontal and vertical lines are parallel to top, bottom, and sides of board.

* 2. Place architect tracing paper over the 1/4" scale quadrille paper. Attach to board with masking tape at corners.

* 3. Using T-square and triangles and drawing to scale, put on straight lines that show for the walls, foundation lines, walks, driveways, paths, and other straight-line features of the property.

4. Sketch irregular or curved lines to scale using french curves.

5. Locate permanent physical features existing on the property.

6. Using symbols (Landscaping Guide No. 1), plot to scale the proposed trees, shrubs, and flowers to be planted in all areas.

7. Ink in all completed pencil lines and symbols. Use india ink.

* 8. Print your name, scale used, address of property designed, and date. Use proper format at right hand lower corner of drawing.

9. If desired, plan may be colored. Refer to Landscaping Guide No. 17.

10. On a separate list name all new trees, shrubs, and flowers in the plan with estimated cost of the plan.

REFERENCES:

Black, Landscape Sketching

Activity Guide No. 6 — Selecting Proper Plants

TOOLS/EQUIPMENT:

MATERIALS/SUPPLIES:

Nursery plant catalog(s), notebook, and pencil.

PROCEDURES:

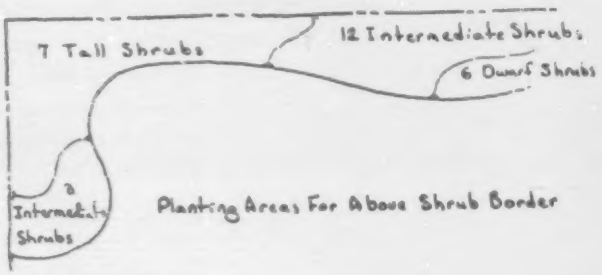
1. Refer to Landscaping Guide No. 4.
2. Select from nursery catalogs the trees, shrubs, and flower types listed as useful for the property to be landscaped.
* 3. Select the landscape plants for the specific location on the property in terms of initial planting, size at maturity, color of foliage and flowers, texture of foliage, bark, branches, etc.
4. Select the landscape plants in terms of soil requirements, drainage, sun, shade, wind, summer heat, or winter conditions.
5. Select the landscape plants in terms of maintenance, i.e., fertilizer, water, and pruning requirements, rate of growth, etc.
6. Select the biennial and perennial flowers for planned flower beds.
* 7. Prepare a complete list of plants to be used with the landscape design. List separately the following landscape plant types:

Trees *Flowers* *Flowering shrubs* *Evergreens*

Indicate quantities needed and planting size for each landscape plant.

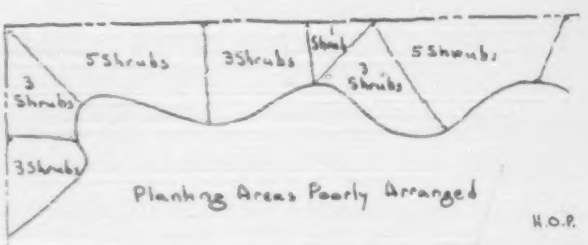
REFERENCES:

Selected current nursery plant catalogs



Large masses of one type of plant should be used.

Variation in the size of the masses makes for a better composition.



LANDSCAPING

Activity Guide No. 7 — Selecting Trees for a Plan

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Notebook, pencil (2-H), and tree nursery catalog

PROCEDURES:

1. Visit site of proposed landscape project.
2. Take notes on existent facilities. Consider power and telephone lines, drains, septic tanks, underground tiles, and the scale relationship between the buildings and the proposed plant materials.
3. Find out soil conditions and slope of terrain.
4. Survey the owner's needs on the amount of shade, color, texture, shape, and beauty expected from the trees to be planted.
* 5. From a tree nursery catalog, pick suitable trees for the proposed location. Keep in mind the mature size, branching habit, hardiness, and maintenance needs of each tree.
6. Sketch suitable trees on the plot plan.
* 7. Present sketching to instructor. Review needs of site and reasons for planting trees in each location.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.
Black, Landscape Sketching.

LANDSCAPING

Activity Guide No. 8 — Selecting Shrubs for a Plan

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Notebook, pencil (2-H), and shrub nursery catalog

PROCEDURES:

1. Visit site of proposed landscape project.
* 2. Take notes on existent facilities. Consider buildings, windows, doorways, sidewalks, and driveways.
3. Find out soil condition, slope of terrain, and any drainage problems.
4. Survey the owner's needs for such things as foliage, fruit, branching habit, and flowers desired from shrubs and/or trees.
5. Consider specimen, accent, foundation, border, screen, and hedge plantings.
* 6. From a shrub nursery catalog, pick suitable shrubs to meet the owner's needs and the site's needs.
7. Sketch in suitable shrubs on a plot plan.
* 8. Present sketching to instructor. Review site's needs and reasons for planting shrubs where you did.

REFERENCES:

Nelson, Landscaping Your Home
Black, Landscape Sketching.

LANDSCAPING

Activity Guide No. 9 — Selecting Flowers for a Plan

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Notebook, pencil (2-H), and flower seed catalog

PROCEDURES:

1. Visit site of proposed landscape project.
2. Take notes on where flower beds could most likely be planted. Mark locations of shrub backgrounds, retaining walls, etc.
3. Note soil conditions, slopes of terrain, and any drainage problems.
4. Survey the owner's needs for color, size, and shape of flowers wanted.
5. Draw a flower border design on paper. Show where the annuals, biennials, and perennials should be planted.
* 6. Sketch in accent points; and draw a flowing sequence of related sizes and shapes around them.
7. From a flower seed catalog, pick suitable flowers to be planted around the site, and label them on your sketch.
* 8. Present the sketch to your instructor. Be ready to discuss the reasons for your design.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.
Black, Landscape Sketching.

LANDSCAPING

Activity Guide No. 10 — Foundation Plantings

TOOLS/EQUIPMENT:

Nursery catalogs, notebook, and pencil

PROCEDURES:

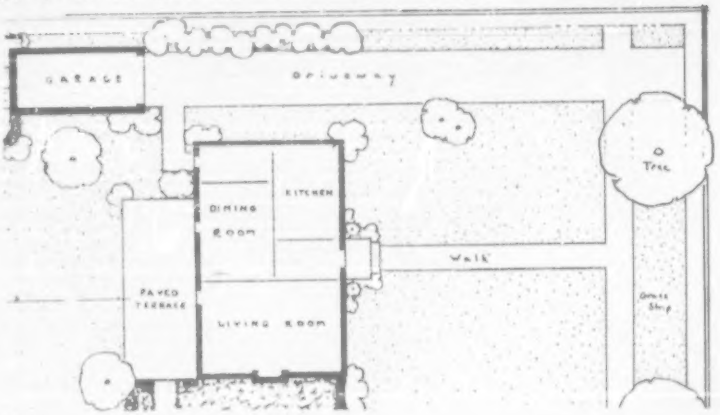
1. Refer to Activity Guide No. 4.

2. Select suitable plants for the front, outside corners, and inside corners of the foundation of a house.

* 3. Select at least eight foundation plants for each of the following locations:
   1. Entrance to house.
   2. Outer corner foundations.
   3. Inside corners.

4. Prepare list of the plants with the following information:
   a. Variety name and average mature growth.
   b. Characteristics of its foliage or flower.
   c. Season of bloom or accent.
   d. Texture of leaves, stems, and bark.
   e. Soil, water, or special climate needs.

* 5. Prepare a rough sketch indicating how you would arrange the plants you select from the list in No. 4. Give to the instructor for his review.



SPECIAL INFORMATION:

Average mature growth may be modified by trimming and shearing. Keep this point in mind. Also, remember that eventually most foundations have to be replaced in 8 to 15 years.

REFERENCES:

Nelson, Landscaping Your Home.
Nursery Catalogs.

LANDSCAPING

Activity Guide No. 11 — Selecting Border Plantings

MATERIALS/SUPPLIES:

Nursery plant catalog(s), notebook, and pencil

PROCEDURES:

1. Refer to Activity Guide No. 4 and No. 5.

2. Select and list from the catalogs a variety of small trees and shrubs adaptable to border plantings.

* 3. Classify each plant on the list (Step No. 2 above) with the following information:
   a. Variety name and average mature size.
   b. Color of foliage and flowers.
   c. Season of bloom and length of bloom.
   d. Texture of leaves, twigs, and bark.
   e. Soil, water, or special climate needs.
   f. Special features such as autumn coloration, unusual bark or twig features, etc.

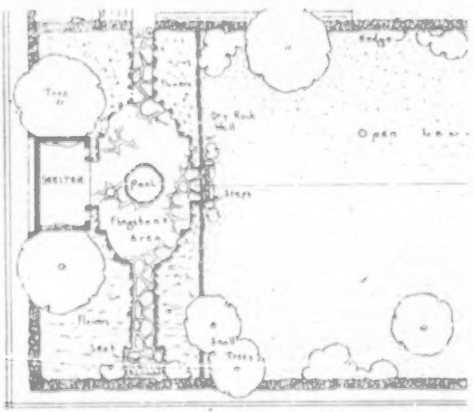
* 4. Prepare a rough sketch indicating how you would utilize the selected plants in a border landscape design. Show instructor so that he can review and comment.

SPECIAL INFORMATION:

Suggestion: List landscape plants on 3" x 5" filing cards for future reference. File according to trees, shrubs, use, special features, etc.

REFERENCES:

Selected Shrubs and Shady Areas, Bulletin #142, U.S.D.A.
Black, Landscape Sketching.



Activity Guide No. 12 — Purchase of Plants

TOOLS/EQUIPMENT:

NONE

MATERIALS/SUPPLIES:

Nursery catalogs, pencil (2-H), and notebook

PROCEDURES:

1. Develop a list of suitable plants that you would use on a proposed landscape site.
2. Look through at least three nursery catalogs to see which company would give you the best price, guarantee, and delivery dates, and reliability.
3. Draw a chart comparing price differences on the plants that you would want to order.
* 4. Decide when to place order, so that they are planted at the proper time of year.
5. Write a summary report listing plants, comparative prices, and ordering times from the three nursery catalogs.
6. Fill out an actual order blank from the nursery catalog that you have chosen.
* 7. Review with your instructor.

REFERENCES:

Hoover, Approved Practices in Beautifying the Home Grounds.
Conover, Grounds Maintenance Handbook.

Activity Guide No. 13 — Planning the Public Area

TOOLS/EQUIPMENT:

Drawing Board, T-square, triangles, and French curves

MATERIALS/SUPPLIES:

1/4" quadrille paper, tracing paper, 3-H pencil, notebook, nursery catalog(s)

PROCEDURES:

1. Refer to Activity Guide No. 5 for drawing board setup.

2. Sketch the "public area" of the residence to 1/4" scale. Use procedures in Guide No. 5.

* 3. Select the following types of landscape plants from the catalogs or from your own choice:
   a. Foundation plants.
   b. Corner plants: inside and outside corners of foundation.
   c. Entrance plants.
   d. Lawn trees and/or shrubs.
   e. Border plants.

4. Indicate the placement or location of the selected plants on the scale drawing.

* 5. Be prepared to give brief reasons why the plants were selected for the specific location. (Refer to Guide No. 11, Step 3 as an example.)

SPECIAL INFORMATION:

Reminder: All plant symbols are sketched to average mature growth of the plant.

REFERENCES:

Black, Landscape Sketching

Activity Guide No. 14 — Planning Family Garden Area

TOOLS/EQUIPMENT:

Drawing board, T-square, triangles, and French curves

MATERIALS/SUPPLIES:

1/4" quadrille paper, tracing paper, 3-H pencil, notebook, and nursery catalogs

PROCEDURES:

1. Refer to Activity Guide No. 5 for drawing board setup.

2. Sketch the "Family garden area" of the residence to 1/4" scale. Use procedures in Guide No. 5.

* 3. Select landscape plants from the catalogs or from your own choice to be used for the family garden area giving consideration to:
   a. Border plantings.
   b. Patio plantings.
   c. Specimen trees and/or shrubs.
   d. Lawn trees and/or shrubs.
   e. Flower beds (biennials, annuals, and perennials).
   f. Garden ornaments (bird bath, sun dial, etc.).

4. Indicate on the 1/4" scale drawing the suggested placement and/or design of the landscape plants selected.

* 5. Be prepared to give brief reasons why the plants were selected for the specific location. (Refer to Guide No. 11, Step 3 as an example.)

SPECIAL INFORMATION:

Reminder: The family garden area should reflect the ideas, wishes, and likes of the members of the family that reside on the property.

Your design should attempt to incorporate the family wishes into a functional and attractive planting.

REFERENCES:

Fifty Small Trees for New Jersey, Bulletin #L-86, N.J. Agri. Ext. Ser.
Black, Landscape Sketching.

LANDSCAPING

Activity Guide No. 15 Planning the Service Area

TOOLS/EQUIPMENT:

Drawing board, T-square, triangles, and French curves

MATERIALS/SUPPLIES:

1/4" quadrille paper, tracing paper, 3-H pencil, notebook, and nursery catalogs

PROCEDURES:

1. Refer to Activity Guide No. 5 for drawing board setup.

2. Sketch the "Service Area" of the residence to 1/4" scale. Use the procedure in Guide No. 5.

* 3. Indicate the specific "Service Area" needs on the 1/4" scale such as:
   a. Driveway and parking areas.
   b. Laundry area (drying).
   c. Waste and/or refuse container area.
   d. Mower, tool storage shed.
   e. Other needs; i.e., compost area.

* 4. Be prepared to give reasons why the "Service Area" was designed as it is for the specific property. (Refer to Guide No. 4).

SPECIAL INFORMATION:

Reminder: All plant symbols are sketched indicating the average mature growth of that plant.

REFERENCES:

Black, Landscape Sketching

LANDSCAPING

Activity Guide No. 16 Coloring Landscape Design

TOOLS/EQUIPMENT:

Set of pastel color pencils and soft gum eraser

MATERIALS/SUPPLIES:

Completed landscape design (tracing paper)

PROCEDURES:

1. Check the completed landscape design for accuracy. Remove all unnecessary pencil lines or smudges.

2. Carefully review the list of plants used in the planting design to be aware of the normal coloration of the various varieties used in the design.

3. Place the design face down on a clean flat surface such as a table or drawing board.

* 4. Select the color to be used, and carefully shade in the plant, lawn, or other feature in a back-and-forth motion. Bear down just enough when coloring to avoid breaking pencil point. Color motions should be in the same direction to provide a more artistic appearance on the face side of the drawing.

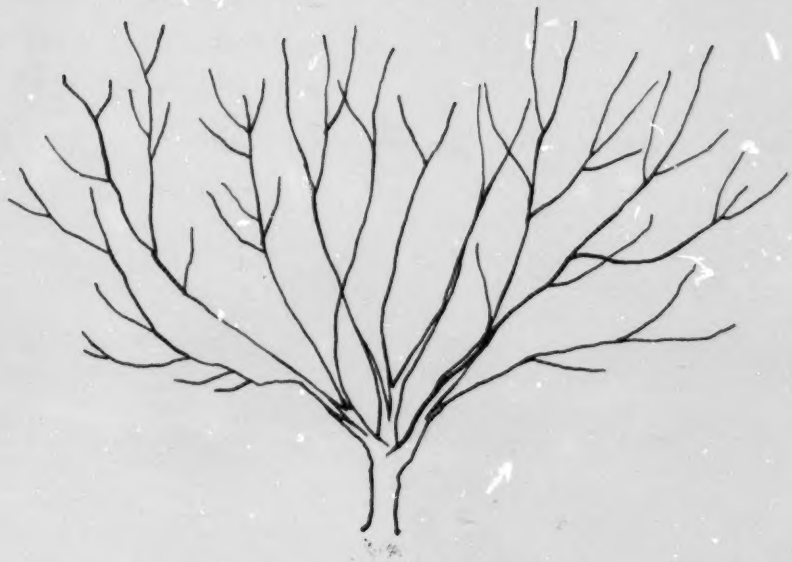
5. Flowering shrubs should be spotted with the flower color first and then a light overrun with green. Do the same with flowering trees. Flower beds may be tinted first with brown or tan, then various flower colors can be topped off with a few touches at random with green.

6. Gray or black may be used for walks and driveways.

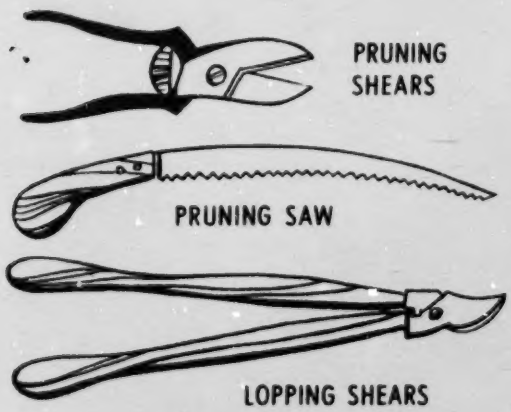
7. Give completed work to instructor for his review.

SPECIAL INFORMATION:

Note: Avoid smudging the face side of the design by keeping hands clean by washing them when necessary. Slip a piece of clean paper under your hand when coloring to avoid getting too much coloring on hands or wrists while working.



IV. HORTICULTURE MECHANICS AREA



Activity Guide No. 1 — Care of Maintenance Tools

TOOLS/EQUIPMENT:

Hand or non-powered gardening tools, metal file, sharpening stone, and oil can.

MATERIALS/SUPPLIES:

Boiled linseed oil, clean cloths, SAE 30 oil, cleaning solvent, and a small 1 to 1½" brush

PROCEDURES:

1. Thoroughly clean all metal and wood parts of garden tools with water or solvent.

2. Inspect condition of grounds maintenance tools such as metal edges of shovels, spades, edgers, cutting edges, and wood parts for cracks, splinters, breaks, splits or rot.

* 3. True up all metal working edges of the tools. Refer to procedures in tool manual or reference below for each specific maintenance tool.

4. Wood handles or other wood parts should be lightly sanded with No. '0' or '1' sandpaper to remove rough edges or splinters. Coat wood with two or three coats of boiled linseed oil, and with a clean cloth rub in oil between each application.

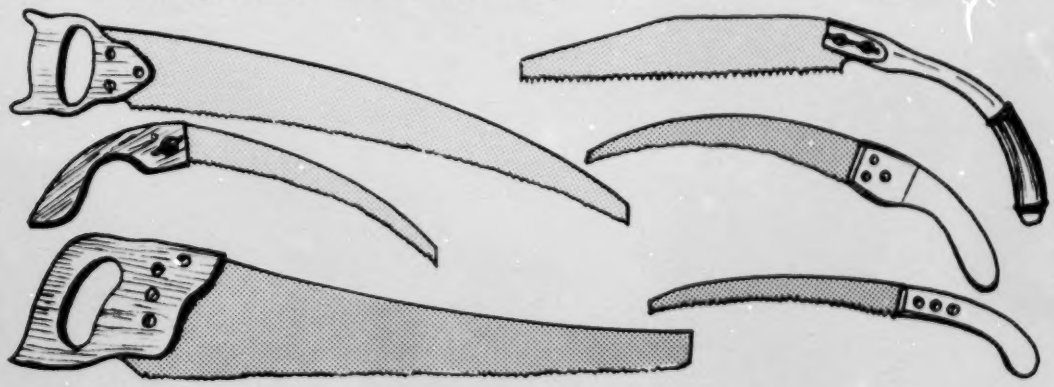
* 5. Lightly oil metal parts (SAE 30), and wipe off excess oil with cloth. Store tools in proper area.

6. Put oily cloths in approved waste containers for oil cloths.

7. Return tools and materials used in assignment to proper storage.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book



HORTICULTURE MECHANICS

Activity Guide No. 2 — Care of Cutting Tools

TOOLS/EQUIPMENT:

Hedge shears, hand pruning shears, loppers, grass trimming shears, florist scissors, lawn edger, grafting/budding knife, bench grinder, sharpening stone, set of wrenches, and screwdrivers.

MATERIALS/SUPPLIES:

Clean cloths, wire brush, and light machine oil (SAE 10)

PROCEDURES:

1. Carefully clean all oil and dirt from cutting tool.

* 2. Determine proper disassembly of tool, if required. Note the correct location of all nuts, bolts, washers, springs, or special parts. Make a brief sketch of the assembly if needed as a reminder of how to reassemble.

3. Note angle of cutting edge, so that you can maintain the same angle when the cutting edge is resharpened or trued.

* 4. If the cutting edge is badly "nicked" or irregular, "true-up" the edge with the bench grinder. Use safety glasses when using grinder.

5. Finish all edges with the fine hand sharpening stone.

6. Reassemble the cutting tool, and lightly oil all moving parts.

* 7. Check the operation of the cutting tool for proper cutting.

8. Refer to Guide No. 1 if wood handles or parts require care.

9. Store cutting tools in proper cabinet or location in the shop.

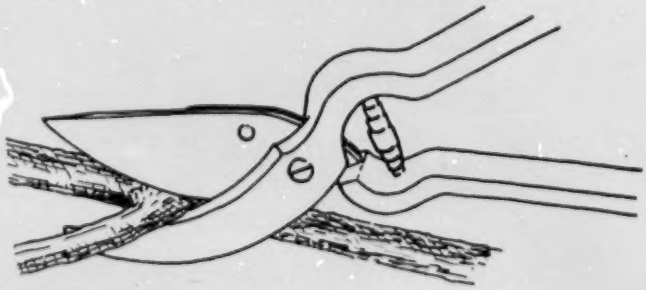
10. Clean work area and dispose of oily cloths in oil waste container.

SPECIAL INFORMATION:

It is suggested that gloves be worn when working with tools that have cutting edges.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book



HORTICULTURE MECHANICS

Activity Guide No. 3

Clean and Gap Spark Plug for Air-Cooled Engine

TOOL/EQUIPMENT:

Spark plug wrench with handle, electrode gap gauge, and spark plug cleaning machine

MATERIALS/SUPPLIES:

Clean cloth and 1½" brush

PROCEDURES:

1. Disconnect spark plug ignition wire from spark plug terminal.
2. Thoroughly clean area around spark plug with brush to avoid dirt getting into engine internal parts when spark plug is removed.
3. Remove spark plug using the proper wrench. Align wrench, and use firm steady pressure to remove. If rusted or frozen, check with the instructor for proper procedure to follow to remove spark plug.
4. Cover spark plug port hole with clean cloth to keep dirt from internal parts of engine.
* 5. Inspect spark plug after initially wiping it clean with a cloth. Check for damaged porcelain or electrodes. If the plug appears to be damaged, or the electrodes are badly worn, check with instructor.
6. If plug is normally dirty, clean in spark plug machine. *Use safety glasses when using machine.*
7. Set electrode gap using manufacturer's recommendations.
8. Install spark plug in engine. Connect ignition wire to terminal of plug.
9. Start engine. Use proper safety procedure to test operation of plug.
10. Clean and store tools. Place oil cloths in oily cloth wastecan.

REFERENCE:

Operator's manual for engine, or
Roehl and Longhouse, Farmers Shop Book.

Activity Guide No. 4

Engine Oil Change for Grounds Equipment

TOOLS/EQUIPMENT:

Set of combination hand wrenches and oil drain pan

MATERIALS/SUPPLIES:

Proper grade SAE engine oil for 2-cycle or 4-cycle air-cooled or water-cooled engine, cleaning solvent, and clean cloths

PROCEDURES:

1. Prepare equipment for engine oil change: Disconnect spark plug wire, or turn ignition off, if key operated. Remove key. Caution: DO NOT WORK ON HOT ENGINE.

* 2. Refer to manufacturer's maintenance manual to determine type of oil to use in crankcase. (Example: 2-cycle or 4-cycle oil).

3. Remove oil filler cap or plug. Thoroughly clean cap or plug with solvent and a clean cloth as well as area around the oil fill.

* 4. Remove oil drain plug. Check manual to determine location on engine.

5. When oil has completely drained, clean drain plug and area around drain with clean cloth. Replace drain plug. Do not overtighten plug.

6. Fill engine crankcase with the required quantity and SAE grade type of oil. Check manual.

7. Replace (clean) filler cap or plug.

8. Clean and store tools. Place oily cloths in proper waste container. Place empty oil cans in approved waste container.

* 9. Connect ignition wire to plug. Start engine, and check for leaks.

SPECIAL INFORMATION:

If an oil filter is attached to the engine, check with the instructor for directions on replacing filter or element.

REFERENCES:

Operator's manual for the engine.
Roehl and Longhouse, Farmers Shop Book.

Activity Guide No. 5 — Lubrication of Power Equipment

TOOLS/EQUIPMENT:

Hand operated and air operated grease gun

MATERIALS/SUPPLIES:

Clean cloth and an all-purpose chassis lubricant

PROCEDURES:

1. Prepare equipment for general lubrication. Disconnect spark plug ignition wire, or turn off ignition key and remove from lock.

* 2. Refer to manufacturer's maintenance manual to determine location of all lubrication fittings.

3. Fill grease gun with lubricant, if needed. Check main supply in drum, if power operated.

4. Locate and thoroughly clean all lubrication fittings on equipment.

5. Lubrucate all fittings. Apply enough lubricant to remove old grease. Wipe off excess lubricant around fitting with a clean cloth.

6. Make final check to be certain all moving parts with a grease fitting have been lubricated.

7. Clean and store tools. Put dirty or oily cloths in proper waste container.

* 8. If special lubricants or oils are needed on parts of equipment, check with the instructor before putting equipment back in operation.

REFERENCES:

Operator's manual for the equipment being lubricated.
Roehl and Longhouse, Farmers Shop Book

HORTICULTURE MECHANICS

Activity Guide No. 6 — Cutting Glass

TOOLS/EQUIPMENT:

Glass cutter, framing square or straight edge yardstick or scale or folding ruler. Safety glasses

MATERIALS/SUPPLIES:

Glass to be cut, wax pencil, paper

PROCEDURES:

1. Prepare a flat, clean workbench or table on which to cut glass.
2. Remove all dirt and grease from glass. Wear gloves and work carefully to avoid cuts on hands.
* 3. Place a framing square or straight edge 1/16" inside the measured line to be cut. Use wax pencil to lightly mark line.
4. Maintain straight edge firmly to guide glass cutter. Cut glass with cutter wheel in one continuous sweep. Do not go over a cut or etched area twice.
5. Slide cut glass to edge of bench, and lightly tap under side of glass beneath cutline with top of glass cutter handle.
6. Slight irregular edges can be broken off with the notched edge of the glass cutter.
7. A fine-cut mill file may be used to lightly smooth rough edge of glass.

SPECIAL INFORMATION:

Use safety glasses

REFERENCES:

Roehl and Longhouse, Farmers Shop Book

Activity Guide No. 7 — Adjusting and/or Assembling Equipment

TOOLS/EQUIPMENT:

10" crescent wrench, hammer, punch, 6" and 8" screwdrivers, set of socket wrenches, and grease gun

MATERIALS/SUPPLIES:

Machine oil, SAE 20 or 30 and chassis grease

PROCEDURES:

1. Review the repair manual and parts list for the equipment to be assembled or adjusted.

* 2. If assembling a new piece of equipment, first check to determine that all component parts and pieces are available. Then proceed to assemble, carefully following the directions given in the manual.

3. If adjusting, first determine what adjustments are possible; then review the manual to properly adjust the equipment according to the manufacturer's specifications. Do not overtighten nuts or bolts.

4. Use oil and chassis grease wherever the manual indicates. Remove excess grease or oil which might impair operation of pulleys and belts.

* 5. When assembled or adjusted, test the equipment for proper operation.

6. Use touch up paint for any bare metal parts to avoid rusting. Check heads of bolts, nuts, and washers that may need a coating of paint.

7. Store equipment in proper place and file the equipment manual and parts list so it will be available for proper maintenance of the equipment.

SPECIAL INFORMATION:

If a gasoline power engine is part of the equipment, disconnect the ignition wire to the spark plug, or remove ignition key from starter switch, before storing equipment.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book

HORTICULTURE MECHANICS

Activity Guide No. 8

Winterizing and/or Storing Equipment

TOOLS/EQUIPMENT:

6" and 8" screwdrivers, set of socket wrenches, 10" crescent wrench, hammer, and hardwood blocks

MATERIALS/SUPPLIES:

Waste cloths, SAE 20 or 30 oil, and 6" label tag with attached string.

PROCEDURES:

1. Before removing or adjusting any part of the equipment, first disconnect ignition for safety.

2. Carefully check out the equipment to determine if parts are lost, broken, or worn badly. If so, plan to order new replacement parts so equipment can be repaired before Spring. Check parts list or equipment manual for ordering. Attach tag to indicate needed parts.

* 3. Clean the equipment with a proper solvent, or water. Lubricate all parts that require it. Coat all parts with light oil that may rust over the winter.

4. Drain and replace oil in engine and transmission areas of equipment.

5. Drain water on the equipment, if necessary. (Radiator or tanks).

6. Block wheels in storage, and raise rubber tires off floor with blocks.

* 7. Place dust cover of plastic, canvas, or kraft paper over equipment when it is in storage for a lengthy period.

8. Clean and store tools. Clean area.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book

HORTICULTURE MECHANICS

Activity Guide No. 9 — Carburetor Adjustment on Air-Cooled Engine

TOOLS/EQUIPMENT:

4" and 6" screwdrivers

MATERIALS/SUPPLIES:

1/2" brush and grease remover solvent

PROCEDURES:

1. Review engine manual for the air-cooled engine to be adjusted.
2. Using small brush and grease solvent, carefully (use face shield) clean all dirt and grease from the carburetor to be adjusted.
* 3. When carburetor is dry, start and warm up the engine to operating temperature. Observe exhaust. Black exhaust means too rich a mixture. Too lean a mixture causes uneven running, spitting, and backfiring.
4. Determine the location of the idle adjustment screw and throttle adjustment screw. (Check manual).
5. Close idle adjustment screw finger tight, and then reopen it by two and one-half turns.
6. Turn high speed adjustment screw forward or backward 1/8 turn at a time until engine runs smoothly. Then put throttle screw to idle position.
7. Make final adjustment of idle adjustment screw by turning forward or back 1/8 turn until engine runs smoothly. Allow several seconds between each adjustment for engine carburetor to react to the new setting.
* 8. Instructor will check your adjustment of the carburetor.
9. Clean and store tools. Dispose of brush and solvent properly.

SPECIAL INFORMATION:

The primary purpose of the carburetor is to properly mix air and gas in a vaporized condition so that it is combustible and efficient at all speeds and under all load conditions.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book

Activity Guide No. 10 — Care of Storage Batteries

TOOLS/EQUIPMENT:

6 or 12 volt storage battery, hydrometer, battery charger, and battery carrier

MATERIALS/SUPPLIES:

Distilled water, light grade grease, waste cloth and grease solvent

PROCEDURES:

1. Carefully disconnect leads to the positive and negative terminals of the battery. Remove hold-down clamp, and remove battery from equipment with battery carrier. Do not tilt battery to avoid battery acid spill.

2. Thoroughly clean the battery top and housing with clean water. If there is excessive grease on battery, use a grease solvent to remove grease.

* 3. Check the specific gravity of the battery: Average should be 1.250. If it is between 1.250 and 3.000, check for excessive charging. If under 1.250, check for undercharging. Check each cell separately. Add water (distilled).

4. If battery needs to be charged, use charger. Remove all battery filler caps while charger is operating (not more than at the 3 amp rate).

5. When battery is fully charged, clean terminals and cables. Place battery back into equipment. Adjust hold-down clamp so that it is firm but not so tight that it can break or damage battery case.

6. Connect cables to battery terminals. Know which post is positive and which is negative to avoid flash arch and possible damage or fire.

7. Start engine to check battery performance. Battery should be checked for distilled water needs frequently during prolonged engine use and during very warm weather.

SPECIAL INFORMATION:

Battery plates are easily damaged if dropped or allowed to go for prolonged periods without water covering the tops of each cell. They tend to buckle from heat of charging without water.

REFERENCES:

Roehl and Longhouse, Farmers Shop Book

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